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Scotch Castles.

THE work on this subject, by two Scottish architects, of which the first volume has just appeared,* is, we believe, the first attempt to treat in a complete and consecutive manner a chapter of architectural history full of the most fascinating interest, equally as regards the picturesque of architecture and the picturesque of historical association. We refer now more especially to the section of castellated architecture, which is the subject of the first volume now before us; we presume domestic architecture, in the more restricted sense (perhaps we should say "less restricted," for probably castle life in the Middle Ages was not a very happy domestic existence), is relegated to the second and forthcoming volume. The authors advert in their preface to the late Mr. Billings's well-known work as the principal illustrative book on the subject hitherto, partly to emphasise the difference between their aim and his. Mr. Billings singled out a few specially fine examples, and gave very fine illustrations of them as examples of a certain type of architecture. The object of the authors of the present work is different. They do not profess to compete with Billings's book in regard to beauty of illustrations; their object is to give as many illustrations as possible, and to give not a few picked examples but a connected history of the subject. No one, we believe, will make the complaint which they anticipate as a possible one, that the illustrations are too numerous. In giving a general survey of a subject of this kind the more illustrations the better; and the plans and sections, as well as the views which are given, entirely bear out the authors' remark as to the amount of variety in detail which is to be found even among castles of which the essential features are very similar.

An illustrated treatise on castellated architecture furnishes a curious example of the manner in which force and despotism in life translate themselves into force and power in architecture. Every one of these castles was the centre of a petty despotism or would-be despotism, the symbol of life conducted on the principle that,—

> "They should take who have the power,
> And they should keep who can."

This is not a high standard of life, and yet its architectural imprint is a noble and impressive one, for a system of life which goes by the law of the strongest must needs impress its character on its architecture. And so we have here a whole series of buildings of which the main feature is the expression of stern power and resistance to attack. There is no scamping here, for it is not a question merely of extras or of æsthetics, but of dear life. The stronger the castle, the better stand could be made at the last push, and the more likely was the owner to survive a reverse in the field. Accordingly we must not grudge stone or mason's labour; let us have a castle strong enough to resist the attacks of the combined forces of the Grants of Tulloch-gorum, or whoever else we may be at feud with, and hang the expense. That is the architectural expression of the Scotch Castle; and whatever we may think of its social morality, it is very effective architecturally. Walls 10 ft. to 14 ft. thick; no ornamental nonsense; very small window openings in the midst of great solid masses of walling; overhanging parapets and angle turrets; huge flanking towers to the gateway; such features as these make a combination which we may regard as stern and forbidding, but which is most impressive to the eye of any one with a sense of power and picturesqueness. All the littlenesses and frivolities of architecture are scouted here; solidity and mass, the very foremost essentials of architectural grandeur, are here unalloyed; and the modern man who wishes to build himself a residence of a monumental type, "ære perennius," may sigh over the economic prejudices of the modern contractor, which leave him no chance of building with the impressiveness of his marauding forefathers. To the latter, of course, the building of a castle was not a matter of sentiment at all; it was an exceedingly practical business; and if the MacTavish of the period had been told that men of future generations would regard his castle as a thing of picturesque effect, he would have been very much astonished, if you could have got him to understand what picturesque effect meant, which you probably could not. We look at these violent days now, however, from a safe distance; the strong men sleep their sleep, and only the castles from which they sallied to cut each other's throats or harry each other's cattle remain to tell somewhat of the tale of that wild lawless time to which distance lends a kind enchantment, and nowhere more than in Scotland. The very names of Tantallon, Ruthven, Linlithgow, Ravenscraig, seem replete with poetry; not less so some of the monuments themselves; Neidpath, with its simple solid block of tower overlooking the Tweed which sweeps beneath; Borthwick, with its grand double masses of tower and the deeply-shadowed bay between them. It is difficult to say whether the names or the buildings seem to have most of glamour and romance, associations half of violence half of chivalry; for, as we heard a member of an old Scotch clan reply, when jokingly told that his ancestors lived by lifting cattle,—"Yes: but they always lifted cattle like gentlemen"!

The authors group their castles under three periods, marked by distinctive forms of planning as well as by other differences; the first period ranging from 1200 to 1300, the second from 1300 to 1400, the third from 1400 to 1542. The typical arrangement of the first period is the enclosure of a space by a thick wall or *enceinte*, usually a more or less irregular quadrangle, sometimes a symmetrical square or other figure, with large towers at the angles. This early quadrangular plan is distinguished from the later courtyard plans by the fact that the enclosing walls, though of great thickness, are, in general, merely walls, and do not form part of any of the habitation structures within the enclosure, which in most cases probably were of a much more perishable character than the *enceinte*, as in many instances they seem to have disappeared, though the enclosure walls and angle towers remain in a state of considerable preservation. We give a reproduction from the illustration of the view of the remains of Inverlochy Castle, as one of the most typical examples of mere thirteenth-century castles, which are really walls enclosing a plot of ground rather than actual buildings in the usual sense. Here are seen three of the great circular towers which strengthen the angles of the *enceinte*, with the straight walls connecting them. The courtyard measures 101 ft. by 90 ft. internally, with two doorways, formerly defended by portcullises. The walls are 9 ft. in thickness,—

"The tower at the north-west angle, called the Comyn's Tower, is larger than the rest, and formed the donjon, or residence of the lord of the castle. It is 20 ft. in diameter within the walls, which are 10 ft. 4 in. thick, and contain a staircase 3 ft. 6 in. wide, arranged in the same manner as in the other towers" (a circular stair winding round the internal walls). "The angle towers were provided with loops to light the staircases and upper rooms, but they are now represented only by holes in the walls, the freestone dressings having been torn out. There is, however, one loop left in the north-east tower, showing that they were narrow slits, splayed on the outside, with a round termination or oilet at the bottom. The donjon was probably higher as well as larger than the other towers, as we shall see was usually the case. The whole castle was surrounded with a moat about 30 ft. wide, placed about 40 ft. from the building. This was no doubt supplied with water from the river. Its position may still be traced in the marshy depression in the ground round the castle."

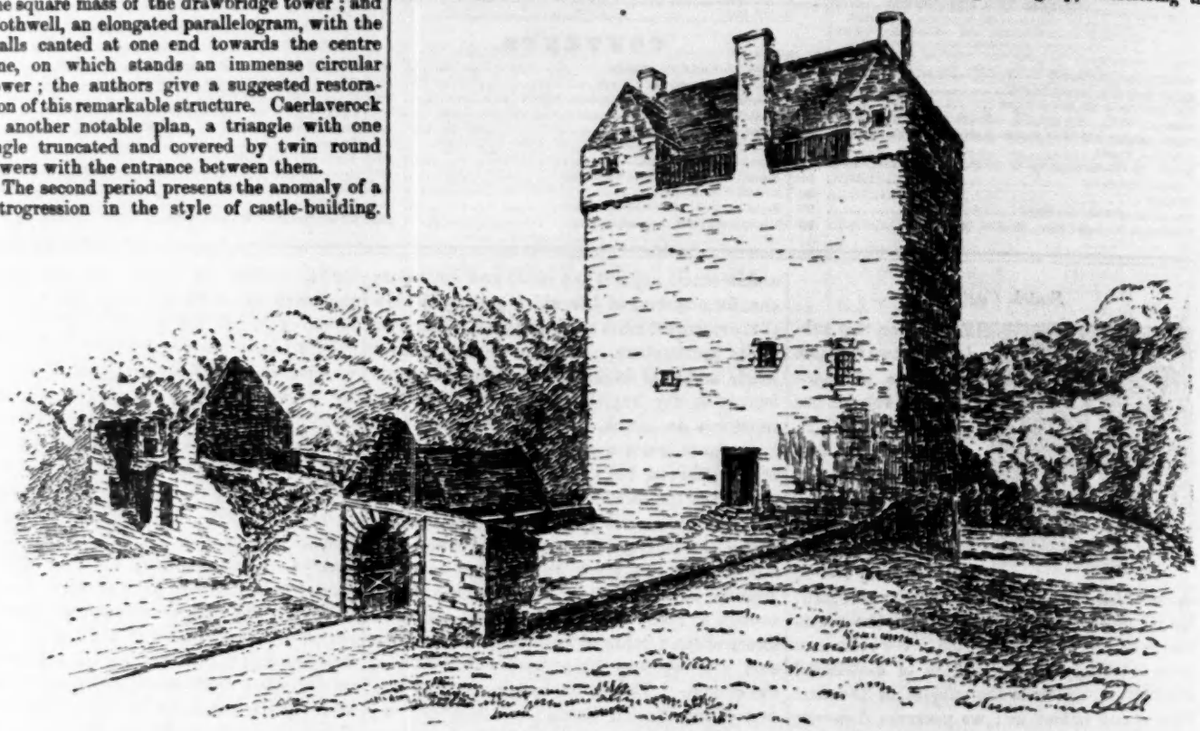
Some portions of the dressings still remain-

* The Castellated and Domestic Architecture of Scotland, from the Twelfth to the Eighteenth Century. By David MacGibbon and Alexander Ross, architects. Vol. I. Edinburgh: David Douglas. 1887.

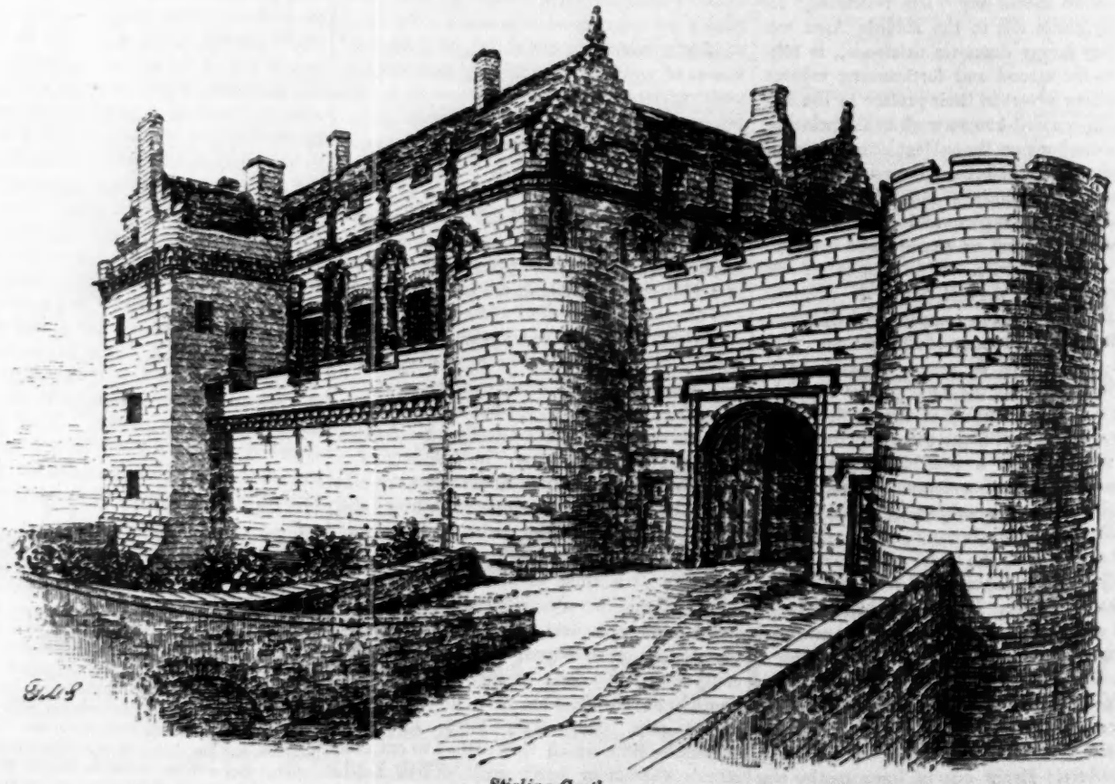
ing show, we are told, that the angles of the openings had plain splays. Nothing is said as to the character of the main bulk of the masonry.

Among the more interesting of the castles included in the first period are Rothesay, with the *enceinte* wall forming an irregular circle, with four towers at equal distances, the whole forming a grand sweep of curves when seen in perspective, the more effective by contrast with the square mass of the drawbridge tower; and Bothwell, an elongated parallelogram, with the walls canted at one end towards the centre line, on which stands an immense circular tower; the authors give a suggested restoration of this remarkable structure. Caerlaverock is another notable plan, a triangle with one angle truncated and covered by twin round towers with the entrance between them.

The second period presents the anomaly of a retrogression in the style of castle-building. "The square towers or keeps which had become familiar to the Scots in their frequent invasions of the northern counties of England, naturally became their model, and all the castles of this period preserved to us are built on this plan. These castles consist of a square or oblong tower with thick walls, built sometimes with ashlar and sometimes with rubble work, and defended from the parapet or the roof, the angles of which are rounded, or more generally projected on corbels in the form of round



Neidpath Cast'e.



Stirling Castle.

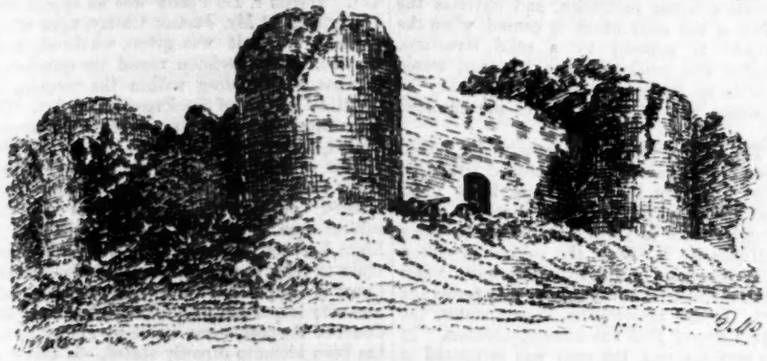
According to the authors, the invasion of Edward I., at the close of the thirteenth century, was the indirect cause of the change and simplification of the form of the castles; the country being so weakened and impoverished that the simplest form of building, a stronghold or keep to accommodate the owner's family and personal retainers, was all that could be afforded,—

open bartizans. The parapets and bartizans have frequently open machicolations, but sometimes merely corbels without openings, and sometimes the parapet is carried up flush with the walls, without projection or string-course. The keeps of this period sometimes depart from the original Norman model to the extent of having a small wing added at one corner, so as to give the building the shape of the letter L."

The ground story of these buildings was usually vaulted, and nearly cut off from the main floor, which was approached externally by a movable stair or ladder, so that assailants who had penetrated into the ground-floor took little by their move, having to make their way to the first-floor by some narrow staircase or trap where they could have been disposed of one by one as they came up. In Rossetti's striking poem, "The King's Tragedy," describing the murder of James I. of Scotland at Perth, the king endeavours to elude his pursuers by descending through a trap-door on the principal floor into this vaulted ground floor beneath, which was not easily accessible to the attacking party, who came up by the staircase to the principal floor. This event was at the commencement of the third period of castle building, as classified by the authors, but their sections of Liberton

and Comlongan towers of that period show that the cutting off of the ground story beneath a massive vault was still continued, so that the "local colour" in Rossetti's description is, architecturally, quite correct.

As an example of the plain tower keep of the second period, we give the view of Neidpath in its present state; the enclosure and buildings adjoining are much later (1654), and of course the roofing and the finish of the walls above does not represent the original state; but the view conveys an idea of the nature of many of these fourteenth-century castles, massive blocks of building rising straight up out of the ground. The illustration, however, does not quite convey to the eye one of the peculiarities of the building, which is that the main block is an *oblique* quadrangle, opposite sides being parallel but the angles not equal: a form probably adopted merely because the conformation of the ground rendered it easier to build it so. The tower is L-shaped on plan, the re-entering angle being on the opposite side from the view. The walls are 10 ft. thick, and the place was in its time a very strong one of the kind. The original entrance was on the further and precipitous side of the site.



Inverlochy Castle.

Borthwick Castle.

The authors go on to illustrate some cases of keep towers of this kind, which have become the nucleus for much more extended buildings grouped around them, such as Crichton and Castle Campbell; but these kind of additions were not developed till a later period. It is by these later extensions to fourteenth-century keeps that we obtain that peculiar and very picturesque combination to be seen in not a few Scotch castles, where the stern architecture of the fourteenth-century keep is combined with graceful and fanciful details founded on French Renaissance, the combination of the two elements being as piquant and striking in the architectural as in the social history of Scotland in the early Renaissance period.

In considering the third period into which they have divided the subject, and which occupies a considerable portion of the volume, the authors commence, before coming to the courtyard form, by describing and illustrating various modifications of the simple keep towers which are to be met with dating from the early part of the fifteenth century. Concerning these we can only pause to remark on the fine example of Borthwick, before alluded to, and of which the illustration is reproduced. It would be difficult to find a more striking instance of stern and grand architectural expression produced simply by the disposition of masses of building. It is noteworthy that these twin towers are not exactly twin, one being a little wider than the other and projecting a little farther, but apparently more from indifference or accident than design. As an instance of the practical engineering of the builders, the lower porthole in the basement of the gate tower (seen in the view) is built parallel with the slope of the hill leading up to the castle, so that the whole hill becomes a *glacis* to it. The authors mention that the building shows signs of more attention to sanitary arrangements than the builders of castles of this date sometimes get credit for.

Among the courtyard castles which began to come into vogue in the fifteenth century, two of the most interesting are Doune and Tantallon, the latter named by Burns as a sort of emblem of endurance, in his prophecy of still greater perpetuity for the fame of Allan Cunningham,—

> "The teeth o' time may gnaw Tantallon,
> But thou's for ever."

Edinburgh Castle is naturally the subject of a lengthy description and many illustrations, for which we must refer the reader to Messrs. MacGibbon and Ross's pages. We give the illustration of Stirling Castle as an example of the courtyard form, showing the old form of round towers flanking the gateway, and the more refined-looking architecture of the courtyard buildings within and showing over them. The circular flanking towers, however, are here more or less of a survival, and not of the ancient date which might at first sight be given to such a feature; and the upper portions and battlements are (as the sketch partly indicates) a restoration, and a very weak one.

The authors merit the thanks of all architectural readers, professional and amateur, for the production of a very well-studied and illustrated handbook of a most interesting class of ancient buildings, of which we hope to see the second and completing volume in due time.

EGYPT: IRRIGRATION REPORT FOR 1885.*

AT the present time, while there has been, and still is, so much heated discussion as to the English occupation, and predominance of English influence in Egypt, and so much scepticism abroad as to the degree of benefit derived from English guidance in the affairs of that country, it is refreshing to be able to turn to one document about which, at all events, there can be no mistake, and which tells its tale of accomplished facts in plain, straightforward, and unvarnished language. The Irrigation Report, drawn up by the Under-Secretary of State in the Public Works Ministry, Colonel Scott Moncrieff, for the year 1885, has lately found its way to this country, and we have no doubt that a brief summary of its contents will be of interest to many readers of the *Builder*. At the outset, however, we must express regret that the Report is not accompanied by a map, as, without its help, it is impossible to identify the localities in which the works enumerated are situated. We can only suppose that the document was originally intended not to travel beyond the limits of the official circle, or, at all events, beyond those of Egypt itself. If so, it is a pity, as every piece of reliable information like this Report will be welcomed in England, and increase the interest that is widely felt in all circles in regard to the country with which she has lately been so deeply and closely connected.

The Report opens by observing that the system successfully begun in the previous year was prosecuted throughout 1885, many improvements being introduced as occasion presented, and as the irrigation officers acquired a better knowledge of the country. Notwithstanding that there was a very much smaller volume of water in the summer, its distribution was so much better managed that a larger area of cotton was irrigated than had ever before been reached. The Barrage (weir) during 1884 had sustained a head of about 7·25 ft.; last year this was increased to 10 ft., so that all the canals received a considerable additional supply. Three temporary dams also were erected at points lower down the river, so as to allow as little as possible of the precious water to escape to the sea. The Nile began to rise at Wady Halfa on the 16th of June, and passing Assouan on the 22nd, it reached Cairo on the 5th of July, the last gate of the Barrage, which is twelve miles lower down, not being removed till the 24th. The festival of opening Khalig-el-Masri, which admits water into the canal on the right bank at Cairo,

* Irrigation Report for 1885. Cairo: National Printing Office. 1886.

took place on the 5th of August, a date somewhat earlier than usual. The flood was a favourable one, for while in the previous year 91,624 feddans (acres) in Upper Egypt were not touched by the Nile flood, and so remained barren, in 1885 there was not a single acre that had not received water.

The manner in which the Barrage was enabled to stand the pressure of the additional head of water was by the construction of a second, or supplementary bar, of rough stone on the flooring, by which means the pressure was divided. The cost of this arrangement was only 7,627*l.*, and as all the stone was afterwards utilised in strengthening the down-stream apron of the Barrage, the advantage of the greatly-increased supply of water was gained at a nominal outlay. It is singular that so simple and obvious an expedient had not been tried before. One of the two large canals which supply the province of Sharkieh was this year cleared by dredging instead of by the customary *corvée* labour; though, owing to the dredger not being well adapted to the work, the expense of excavation was considerable. It is stated that a new drainage system was opened out this year in that province. It sounds strange that such works should be required in a rainless country; but whenever artificial irrigation is resorted to drainage is always required as an accompaniment. By another important alteration in certain canals, the silt clearances, which used to amount to 903,000 cubic mètres, representing *corvée* labour to a value of about 45,000*l.*, were reduced to 106,000 cubic mètres, representing about 6,300*l.* The cost of the alterations themselves amounted to 10,000*l.* In another case the silt clearances were reduced from 80,000 to 5,300 cubic métres, and an increase of about tenfold obtained in the volume of water supplied. The two provinces, Menufieh and Sharkieh, are those which have profited most from the use of the Barrage. The great Central Canal, which in 1882 only took in 4,300,000 cubic mètres per day, in 1885 carried 10,500,000 cubic mètres, which, being distributed in the branch canals by new connecting links, increased their supply, much to the benefit of the crops dependent thereon. It appears, however, that, owing to the exceptionally low volume in the river, those benefits were not conferred without some injury resulting from the abstraction of so much larger a quantity, and nearly 9,000 acres of rice land were reported to have suffered. Even if this were below the mark, Col. Moncrieff "can state fearlessly that at least ten times the area derived great benefit, and that a very large tract, especially in the province of Sharkieh, received water for the summer crop which had never received it before." A very important innovation was made during the year in substituting money payments for silt clearances instead of removing them by the employment of the *corvée* in the Assiout district. A grant of 18,284*l.* was made by the Treasury for the excavation of 397,632 cubic mètres, being, it is said, probably the first time that the State had ever *paid* for earthwork done in Upper Egypt. It was a large sum to lay out, but if it has been the forerunner of a total abolition of the baleful system of compulsory labour hitherto customary, it will prove to have been money well spent. Much discussion appears to have taken place on that subject during the year, and much of the injustice and abuse connected with it having been brought to light, permission was obtained from the Ministry to try an experiment for its redemption in certain villages of the province of Gharbieh, by converting the assumed value of *corvée* leviable into a rate on the land. With much difficulty, and in spite of strenuous opposition, one of the officers, Mr. Wilcocks, managed to maintain his canals without any *corvée*. In 1884 the *corvée* was equivalent to an army of 165,000 men working for 100 days. In 1885 it was equivalent to an army of only 117,700 men working for the same time. The country then was benefited in 1885 over 1884 by the labour of 48,000 men for 100 days.

In protection against the Nile inundation the sum of 61,550*l.* was expended as against 58,000*l.* in the previous year. Experiments were made in substituting roughly-made but hard bricks for the stone used in groynes, with a view to economy. As, however, the bricks lose so much of their weight in water, it is very doubtful whether they are the right material to use for that purpose. Groynes constructed for the purpose of diverting the current off a bank which is being eroded should, however, not be made solid. Experience in Holland on the Danube and in India tends to show that works made of stakes and brushwood with fascines or rollers, which admit of water passing *through* them with a diminished velocity, allow of the silt or sand held in suspension being deposited very rapidly, and so by filling up the foot of an eroded bank, affords a better protection, and obviates the effect of the eddy which is caused when the current is opposed by a solid structure. Timber and brushwood are, however, scarce articles in Egypt, and possibly this may be a reason why stone structures are resorted to.

The yield of the harvest is naturally looked upon as the measure of successful irrigation operations, but in Egypt there is no great credit to be obtained from a plentiful cereal crop, for there is always abundance of water available for it. It is the culture of cotton and sugar-cane, both requiring most water when the river is at its lowest, that forms the test. In this respect, the Report states, the cotton crop of 1885 was a disappointment. In the previous year the crop was estimated at 3,650,000 kantars, 13 per cent. higher than it had ever been known before. In 1885 the area sown was reported as considerably greater. The water-supply was more abundant. All seemed prosperous till the end of August, when a series of fogs set in, the cotton worm began its ravages, and where a yield of 4 or 5 kantars had been expected, the crop was not more than 2 or 3. Finally, the price in the market being very low, and at the same time that of wheat rising, the cultivator, instead of waiting for his last pickings, ploughed up the cotton plants and sowed wheat. The crop seems to have been injured by the inferiority of the seed sown, by over-cropping the land, and by defective drainage, the last of which causes is in process of being remedied.

Amongst the final paragraphs of the Report, the important announcement is made that, on July 27th, a decree was issued granting a million sterling to the Public Works Ministry for the improvement of irrigation works. Additional officers were at once obtained from India, and work was begun in earnest in the following October. Two projects especially had been under discussion as to the best method of improving and extending the supply of water for irrigation: one, the construction of a new weir, to be built across the Nile below Benha, some miles lower down the river than the Barrage; the other, the excavation of a large new canal from the eastern end of that work to supply the existing canals. The latter has been decided on as preferable.

The perusal of this Report certainly affords a satisfactory proof of the activity and usefulness of the Public Works Department of the State, and augurs well for a steady development of the agricultural revenue of Egypt. The rulers of that country have good reason to thank the Government of India for the experienced officers which it has sent there, and, as far as the Irrigation Branch of the State, at least, is concerned, there can be but one opinion as to the success of the guidance of the British Government in Egyptian affairs. It may be hoped that when the whole story comes to be told, it will be found that Great Britain is able to render an equally good account of its stewardship in all Departments of the State.

Art Copyright.—We hear that this much-vexed subject will be treated in a complete and succinct manner by Mr. Reginald Winslow, barrister-at-law, in the new volume of "The Year's Art for 1887," which we believe is now ready. The volume contains some other important new features, and is published by J. S. Virtue & Co.

TWO DECISIONS ON THE LAW OF LIGHT.

THERE have just been reported in the Law Reports two cases on the subject of the law of light, which are of considerable importance. The first seems to lay down a definite principle, the other to afford an example of the way in which the Judges will exercise the discretion which they possess, under Lord Cairns's Act, either to grant an injunction or else to award damages when a right to light has been infringed. The first case is that of Harris *v.* De Pinna (Law Reports 33, Chancery Division, p. 238); the second, Greenwood *v.* Hornsey, in the same volume of the Law Reports, at p. 471. Harris *v.* De Pinna was an appeal from a judgment of Mr. Justice Chitty, upon whose decision, when it was given, we briefly commented. That decision raised the question as to what is a building within the meaning of the third section of the Prescription Act. The structure in question was a place for storing timber, and it was held that this did not constitute a building. Having already noticed that judgment, and as it is now commented on in the text-books on this subject (see Roscoe's "Digest of the Law of Light," second edition, p. 3) it is unnecessary again to refer to it, because the decision of the Court of Appeal proceeded on other grounds. The very important principle enunciated by the Court of Appeal,—one which we are not aware has been hitherto directly stated,—is that it is necessary to show "not only that the building has in some way or other enjoyed light, but that it has done so by a *definite access* for the statutory period." Applying this principle to the structure, the subject of the case before the Court, in which at one time a side would be open, and at another time closed up by piles of timber, it became clear that it was unnecessary to decide whether it was a building within the meaning of the Prescription Act. Because even if it were, and the light had not been enjoyed through one and the same definite aperture, of course, as Lord Justice Bowen said, "it does not follow that because you have not for some one moment or another in each year happened to enjoy the full flood of light which would pass through an uninterrupted window, that still there may not have been a continuing enjoyment which would satisfy the statute: otherwise a man could not pull down his blinds without fear of losing his right of light. One must look at the whole case and see whether this has been a continuous enjoyment for twenty years." Thus Lord Justice Bowen explains the strict principle laid down by Lord Justice Cotton and himself, and it follows from the two judgments that in order to give a right to light there must be an enjoyment of the light through a definite opening without obstruction except from merely temporary and necessary interruptions.

The main point of interest in Greenwood *v.* Hornsey is that the Judge refused to give damages to the plaintiff, as the defendant's counsel desired, and granted him an injunction. The diminution in value of the plaintiff's premises amounted, according to the evidence of the plaintiff's own witnesses, to 600*l.*; we may fairly, then, take it that the damage was, in fact, less. It appeared that at least 6,000*l.* had been spent on the defendant's premises, yet the Judge ordered a certain portion of the offending building to be pulled down. Under ordinary circumstances, this would seem to be a case in which the discretion given to the Judge by Lord Cairns's Act should be applied by the award of damages. In Holland *v.* Worley (Roscoe's "Digest of the Law of Light," p. 55), the late Mr. Justice Pearson summed up the reasons by which a Judge should be governed under such circumstances. But in the present case, on the motion for an interim injunction, the defendant had given an undertaking to pull down part of his building if ordered to do so, provided he was allowed to continue to build up until the hearing of the motion. Therefore, he went on building at his own risk, and this appears to be the reason why Vice-Chancellor Bacon refused to award damages. Had it not

been for this circumstance it seems clear that to have granted an injunction in place of damages would not have been a just decision, because, to apply Mr. Justice Pearson's judgment, this was a case where the plaintiff could be compensated by money, and where, in spite of the diminution of the light, his building would remain "substantially useful to him." It shows the danger, at any rate, of continuing to build after a warning, on the chance that a Judge will award damages only. In regard to the question of judicial discretion on matters of fact, it is wholly impossible to foretell what the decision will be, and, therefore, unless the plaintiff is satisfied with an undertaking by the defendant to pay damages if they are awarded at the trial by the Judge, it is most imprudent to continue a building on the chance of there being no order made to pull it or part of it down.

NOTES.

A FEW days will usher in a year which will be noteworthy for the immense number and variety of the schemes to commemorate Her Majesty's Jubilee; and if a list could be drawn up of the different plans proposed or already adopted throughout Great Britain, we should be astonished at the range of subjects suggested by local taste or convenience. One thing, however, is certain, that, whether in London or the provinces, an extraordinary impetus will be given to the building and contracting trades, and that no man, willing and able to work, will have the least opportunity of saying that he could not meet with employment. Monuments, statues, public parks and gardens, baths and washhouses, churches, libraries, hospitals, assembly-rooms, town-halls, &c., will spring up next year like mushrooms, not to mention the great central schemes of the Church House and the Imperial Institute. Some of the proposals, of course, are more or less catchpenny, such as the tower, 400 ft. in height, which is to rise from St. Martin's-lane, and to dwarf every building in London by its lofty hideousness, without a shadow of justification in the way of utility, either for the service of art or humanity. Of all the proposals that we have yet heard, Herefordshire may be congratulated on having one of the most definite and desirable. The Dean and Chapter have issued an appeal for funds (35,000*l.*, we believe, is the sum named) to enable them to rebuild the west front of the cathedral, which fell down exactly 100 years ago, crushed by the western tower, that was too heavy for its foundation. This front is thought to have been built by Bishop Robert de Lorraine or Lozing, who was consecrated by Archbishop Lanfranc in 1079, and it is said to have been the most perfect specimen of arcade work in the kingdom. The defaulting tower was built about 1320. Included in the proposed undertaking is the refacing of the great central tower, which is showing many signs of decay. Fortunately, the mischief is external, and there is no fear of its sharing the fate of the western tower, which was made secure between 1843 and 1847 by Mr. Cottingham. Including his, the proposed restoration, if carried out, will make the fourth, the other two bearing the names of Wyatt and Sir Gilbert Scott. Over 60,000*l.* has already been spent, principally during the time of Deans Mereweather and Dawes, between 1842 and 1863, and although the sum asked for now is certainly large, Hereford Cathedral is worth it all.

CONSIDERABLE improvements are being carried out at Winchester Cathedral. The northern part of the churchyard is being planted, and the Dean and Chapter hope to make the pathway round the cathedral and complete the improvements in the course of the winter. The dangerous high wall at the east end of the northern churchyard is to be removed and a substantial iron railing will take its place, which will greatly benefit the aspect of that somewhat forsaken district of the city. The new pathway will give the public a broad and pleasant walk all round the cathedral; the turf will be reduced to order, and the clearance of more of the soil which impedes the view of the original level of the Norman work will be carried out. The Dean and Chapter, at whose instance this is going forward, also propose to prosecute further investigations underground in the hope of finding the foundations of St. Swithun's Chapel and of the curious Anglo-Saxon tower described by the Monk Westan in the tenth century. These works will cost about 200*l.*, and subscriptions towards the expense will be gladly received by the Dean. The small charge customarily made for showing the cathedral crypt to visitors has produced a sum sufficient to pay for the rebuilding of one bay of Walkeline's Lady-chapel which was left unfinished last winter, and it has also defrayed half the cost of the handsome tomb in which will be deposited the remains of Bishop Peter Courtenay, whose coffin was found last December in the easternmost part of the crypt. During recent excavations a trench was driven due north from the north-west door of the church, because constant tradition affirms that at that spot, just under the drip of the eaves of the roof, St. Swithun was buried in obedience to his own orders. The trench crossed the exact spot in which the saint is said to have lain until St. Ethelwold translated the remains to the new church. At a depth of 9 ft. below the present surface, and well beneath some chalk cists containing bodies which have rested there for many hundred years, an iron ring nearly 4 in. in diameter, with a staple of 5 in. in length attached to it, was exhumed by the excavators. In this much-corroded piece of antiquity, those who care to do so may recognise a veritable relic of the sepulchre of St. Swithun, which had a ring of this nature securely fastened into the top of the massive block of stone which formed the corner of the saint's sarcophagus, and which was miraculously drawn with ease from its position and replaced securely in position by a certain aged smith in token of the divine command laid upon him to initiate the business of translating the remains to a more honourable position in the church.

IT is curious to notice how often the desire of great capitals is to be connected directly with the sea, as though it were the one thing needful to make the situation complete. Amsterdam some years ago fulfilled this condition, although it really was a port previously, but with a roundabout outlet. Paris and Manchester are both at work with the same object, and now we hear the same of Brussels, where proposals have been made to the municipality by an English company to construct a canal to the Scheldt, with a depth of 6½ mètres, and quays sufficiently spacious to allow twenty ships, of 2,500 tons burden each, to lie alongside; the whole to be connected with the great Belgian railway lines. An important undertaking is about to be commenced in South Russia, by the cutting of a canal across the Isthmus of Perekop, to connect the Sea of Azoff with the waters of the Black Sea. This will save 100 miles of very rough sailing, and especially the dangerous passage of Kertch, which in winter is often closed by ice. By this canal, the coalfields of the Donetz basin would be brought into the market, while the coal and salt trades of Odessa would be revolutionised.

WE have not as yet had an opportunity of seeing *in situ* the large series of mosaics, from designs furnished by Messrs. Clayton & Bell, which have just been completed on the wall of the nave of Chester Cathedral. The cartoons we have seen at Messrs. Clayton & Bell's; they give the facsimile of the tesseræ work. The subjects are from the Old Testament, and consist of four large figures of Abraham, Moses, David, and Elijah, each between two scenes from their respective lives. The life of Abraham is illustrated by the Sacrifice of Isaac and the Burial of Sarah; that of Moses by the finding of the cradle and the scene where Aaron and Hur held up his hands; that of David by David before Saul (after the slaughter of the Philistine) and by his grief over the death of Absalom; that of Elijah by the scene with the angel on the way to Horeb and the scene with Ahab in Naboth's vineyard. The tone of colour is generally somewhat similar to that which we have been accustomed to in Messrs. Clayton & Bell's windows, rather subdued and cool in general effect; and this kind of colour scheme suits well with the material employed, Messrs. Burke's marble mosaic; of course, the effect is very different from that of Venetian mosaic, and there may be something in the claims which have been inserted in some daily papers, that this is more suitable to a Northern cathedral than the gold and brilliant colouring of the Venetian mosaic; at least, so far as this, that we very seldom are allowed in this country to carry out a complete scheme of polychromatic decoration, and Venetian mosaic almost requires to be part of such a scheme, where everything is in harmony. There is no advantage, as seems to be supposed, in the fact that large tesseræ are employed (as in the Roman mosaic pavements), unless the work is at a very considerable distance from the eye; on which head we have seen no information. If these mosaics are near the ground-line of the cathedral, beneath the windows, the tesseræ are unquestionably too large for a good effect in such a position.

MR. JOHN HONEYMAN, of Glasgow, has published a paper on "The Incidence of Taxation as affecting the Housing of the Poor." It was originally read at a meeting of the Architectural Section of the Philosophical Society of Glasgow on December 15th. The object of the paper is to show that the rating of houses is a hardship on the poor, and that the nominal payment of house-rates by landlords is, in fact, a payment by the tenant, on whom the burden ultimately falls in the shape of rent. Mr. Honeyman exemplifies the unrighteousness of house-rates by the instance of a thrifty mechanic who lives in a house and pays rates, and a thriftless workman who lives in lodgings and pays none. It is disappointing, however, to find that when Mr. Honeyman asks himself the question, "How can the necessary taxes be raised in any other way?" His answer is, "It must be evident to you that it is quite impossible for me to enter on that subject to-night." It is altogether useless to show that a tax to raise necessary funds is burdensome and injurious in its consequences, if a better plan in place of it is not suggested. Mr. Honeyman's paper is interesting and suggestive, but the absence of an alternative scheme causes it to be of little practical value.

THE Government of India has lately published two official returns of the agricultural implements and machines which have been introduced into India since the year 1882-83, and which have met with more or less success. Out of sixteen different ploughs, the "Duplex," Watt's "Turn Plough," and the "Swedish Plough," seemed to have yielded the best results, but the latter has been found too heavy for ordinary-sized cattle. The implement which apparently suits the means of the cultivator best is the "Bengal Plough," manufactured at the Government Iron Works at Burrakur, and described as "a soil-inverting cast-iron plough." Its very low cost, 6*s.* to 10*s.*, puts it within the reach of the humblest, and that its economy is appreciated is evidenced by the fact that 212 ploughs were sold in the first two months of its introduction; the best possible test of its suitability and efficiency. Of irrigating machines, the Cawnpore chain-pump seems the favourite, but its price, 5*l.* 10*s.*, is rather too high to allow of its being very generally used. Attempts to reduce its cost will, it is said, be made at the Burrakur Works. Messrs. Hunt & Co.'s chaff-cutter, as stated by the Director of Agriculture and Commerce, is "getting very popular." As yet there is not much demand for other kinds of implements, such as harrows, corn-shellers, and thrashing-machines. But machinery connected with sugar-manufacture meets with demand, especially cane-crushing mills, evaporators, and centrifugal machines. A general

introduction of machinery in agricultural operations marks a new era in India, for, independent of their poverty, the native cultivators are very conservative in adhering to the methods and customs of their forefathers. At the same time they are intelligent enough to appreciate such innovations as are likely to conduce to or add to their prosperity, and the machines which combine efficiency with moderate cost will be most acceptable, so that manufacturers in England who are desirous of securing a market in India will do well to keep those two essential conditions always in view.

WE hear that the Society of Arts have obtained leave from the Benchers to set up a plaque, or tablet, at Lincoln's Inn in memory of John Thurloe. Born in the year 1616, at Abbots-Reading, Essex, whereof his father was rector, Thurloe entered of Lincoln's Inn, and was "called" in 1647. Having been appointed receiver of the cursitor fines in 1648, he in 1652 became Secretary to the Council of State; and in December of the following year, a protectorate having been declared, Secretary of State to Oliver Cromwell. He filled that office under Richard Cromwell (who, by the way, was in after years a student, like to his father, at this same Inn) until January, 1660, when Thomas Scott replaced him. He died in 1668, and lies beneath Lincoln's Inn Chapel. The chambers to be distinguished are the ground-floor set at No. 24, Old-square (*olim* Gate House-court), their windows looking upon Chancery-lane. These he tenanted during the period 1646–1659. Having regard to the highly important and confidential business which passed through Thurloe's hands, much of it being secret service, it is scarcely too much to say that in these rooms the affairs of England, perhaps of Europe, were for a while controlled. Thurloe also had chambers in Dial-court, since known as No. 13, Old-square. In a false ceiling of No. 13 were accidentally found, *temp.* William III., the collection now known as the "Thurloe State Papers," which Dr. Birch edited in seven volumes, folio, 1742. Subsequent chroniclers have confounded, or rather treated as one, the two sets of chambers. We believe that the numbers of the staircases have not been changed. The No. 13 of Thurloe's and Dr. Birch's days was pulled down in the autumn of 1881 for the lengthening westwards of the chapel.

IN the last issue of the *Mittheilungen* of the German Archæological School at Athens (1886, II.), a very remarkable grave-relief is published, of a style so far unique. The subject represented is a warrior, with spear, shield, and helmet, in the act of trampling on a fallen foe. Though we have a number of grave-reliefs with somewhat analogous representations, *e.g.*, the famous Dexileos stele, they are always monumental in character, both as regards the fallen as well as the victorious warrior. Here we have the scene represented from the point of view of the situation. The execution is as singular as the conception of the scene. It is simply a drawing in stone as thoroughly pictorial in manner as the bulk of the reliefs so far known to us are sculptural. The effect on the eye in the excellent autotype published in the *Mittheilungen* is so foreign that at first sight one is tempted to think that the relief is not Greek at all. A closer inspection corrects the error, but leaves the impression that this is Greek painting, not Greek sculpture. The relief gives occasion to an interesting paper by Dr. Loewy on the connexion between the sister arts of relief working and painting. We may add that the stele is inscribed Αλκιας Φωκευς. It was found at Corinth, and is now in the Central Museum. It is a specimen that should, we think, find its way rapidly into cast museums, if only from its remarkable technique, and with a view to correcting any too narrow view of the scope and manner of Greek relief work.

THE statement made by M. de Lesseps as to the prospects of the Panama Canal, at the meeting of the Geographical Society at Paris on the 17th current, is the most enigmatical that has yet been reported. "There will not be sufficient time," he said, "for the construction of locks. We shall make them later on; the essential point is, that by the date mentioned shipping shall be able to pass through the canal." But the object of making locks is to diminish the excavation, by raising the level of the canal. If the latter were so far completed as to allow of the passage of shipping, it would be not only unnecessary, but impracticable, to insert locks later on. The seven kilomètres of the sections of Culebra and Emperador contain fifty millions of cubic mètres of excavation, of which seven millions and a half were excavated up to the spring of the present year. The avoidance of cuttings of such unprecedented magnitude by passing through a series of locks has always been advocated by a section of the supporters of the canal; and the report of July last was taken to intimate that M. de Lesseps had become convinced of the necessity of adopting his expedient. But to open the canal first, and then to make locks in it, is a proposal which it is impossible to comprehend.

IN order to give encouragement to the art of designing and executing medals, the Society of Medallists will next year award prizes for models in plaster of medals commemorating the Jubilee of her Majesty the Queen. The Society intends issuing casts in bronze of the successful competitions. The Hon. C. W. Fremantle, Deputy-Master of the Mint, is President of the Society, and the Honorary Secretaries are Mr. R. S. Poole and Mr. H. A. Grueber, of the British Museum. The competition will be open to all artists and students.

VASES with Corinthian inscriptions are still rare, and beyond their epigraphical value have the special interest that they often help us to determine the early pre-Attic art form of a myth. Such is the case with the interesting Corinthian vase from the Louvre, which Dr. Graef publishes in the *Jahrbuch* of the German Institut (1886, band I., drittes heft). The scene represented is Peleus lying in wait for Thetis: from a careless reading of the inscription the design had previously been interpreted as representing Odysseus surprising Nausicaa and her maidens. The *wrestling scene* of Peleus and Thetis is very well known, and hitherto it has been customary to consider this as the rude and earlier form of presentation. The surprise scene, as we have it in the famous polychrome Cameiros vase of the British Museum, was regarded as a softer type, originating in later days. We now see that the Cameiros "surprise" type is only the late descendant of a long line of ancestors. The discovery is certainly a warning to vase-students to be careful in their statements as to the priority of certain types. With the Corinthian vase Dr. Graef publishes the fragments of a very charming, fine red-figured vase, now in the possession of Dr. Heydemann at Halle; it was found at Ruvo, and in date stands about midway between the Corinthian and the Cameiros vases.

THE same number of the *Jahrbuch* contains a note by Dr. Furtwängler worthy of attention, on the celebrated bronze "praying boy" of Berlin, which has recently raised so much attention. Dr. Furtwängler publishes a gem of the Stosch collection, which must long ago have excited attention but that it is catalogued under the erroneous title, "Prométhée debout attaché aux rochers." It represents a boy in the conventional attitude of prayer, with the hands uplifted in a pose closely analogous to that of the Berlin bronze. The specially-interesting point is that the gem echoes in style *not* the Berlin bronze, which is late and soft in character, but rather some earlier embodiment of the same type, probably of Polycleitean date.

THE new National Liberal Club-house, situate at the junction of Whitehall-place with the Victoria Embankment, and of which Mr. Alfred Waterhouse, A.R.A., is the architect, is rapidly approaching completion, and it is hoped that the building will be available for members at Midsummer next, when it is anticipated that, in consequence of the Queen's Jubilee celebration, an unusually large number of country members will be in Town. We gave views and description, with a plan of the upper ground-floor of the new club-house, in the *Builder* for May 9, 1885.

THE Christmas number of the *Art Journal* contains a fine photogravure of one of Meissonier's finest works, the figure of "*Lui*" on his white horse, with the title "1814"; and the New Year's number starts with an effective etching by Mr. Murray from Mr. Luke Fildes's "Venetians." Among the special subjects promised for the ensuing year are some articles on the modern use of terra-cotta, by Mr. E. Ingress Bell.

THE year's number of the *Portfolio* is a beautiful volume in regard to the illustrations, not without matter of permanent interest also in the letterpress. Among articles interesting to architectural readers are those on "Hatfield House" and on "The Borough, Old and New" (both very well illustrated). Among the landscape illustrations are some very fine and effective mezzotints, especially one by Mr. Brandard, after Rembrandt's "Tobias and the Angel."

HONORARY Secretaries of Provincial Architectural Societies seem, on the whole, to take life easily, if we may judge by their deliberation in forwarding news of their Societies' doings. In another column, for example, is a very brief paragraph, giving an account of a resolution passed at a meeting of a provincial society, held on Tuesday, *last* week, and forwarded to us on the Friday morning following, too late, of course, for insertion in last week's issue. This is no uncommon experience. Hon. Secretaries who send news of this kind seem generally to take two or three days to think about it first. The consequence is that their missives have frequently to be relegated to the category of what is vulgarly called "stale news," information which is out of date. A brief *résumé* of what is done and said at a meeting may be of interest if sent at once, but in most cases it is of very little interest the week after. Hon. Secretaries will, perhaps, kindly note this, in their own interests as well as ours.

THE PARLIAMENT- AND GREAT GEORGE-STREETS SITE AGAIN.

THIS debateable ground is again the subject of projected improvements. It will be remembered that just two years ago a scheme was promulgated by a company for the construction of a new street from Parliament-street to Delahay-street (opening into the latter at a point over against No. 15), and for the widening of those thoroughfares, together with Charles-street. Statutory notices have just been given for another Bill, also promoted by a company, containing very similar provisions, but with the substitution of two new streets from Charles-street to Great George-street, and Great George-street to Broad Sanctuary, in lieu of that from Delahay-street to Parliament-street. The company propose to widen Parliament-street along its western side for the whole length between Charles-street and Parliament-square, to move further southwards the existing line of Charles-street opposite to the Local Government offices; and to widen Delahay-street for the whole of its eastern side, and along its western side from No. 9 southwards. This last-named operation will serve to straighten the existing elbow in that thoroughfare. Powers will be asked for authority for compulsory purchase of lands, &c. required for the works, and for exemption from the provisions of section 92 of the Lands Clauses Consolidation Act, 1845. Clauses will be inserted in the Bill for conferring its powers on a company to be incorporated thereunder, or upon trustees for carrying out any national or public work or object, upon the Commissioners of Woods, Forests, and Land Revenues, the First Commissioner of Works, or upon the Corporation of London, or some of them. It has been suggested that here might be found an appropriate

site for the Queen's Jubilee Church House, or the Imperial and Colonial Institute.

Parliament-street was built in the middle of last century, pursuant to an Act 28 and 29 George II., c. 38, as an approach to Labelye's (Old) Westminster Bridge, which was opened for traffic on November 17, 1750. About this time the Woolstaple,—its round tower and water-gate destroyed for the bridge's western abutment,—gave way to Bridge-street, whereof only the northern side remains, and that entirely rebuilt. Some thirty years previously had been pulled down the King's Gate, in King-street, which stood by the opening into Downing-street. This gate should not be confounded with the Cockpit or "Holbein's" Gate by Whitehall. At that point branched off eastwards a narrow thoroughfare, skirting the old Palace bowling-green and Lord Loudoun's house, and communicating through Bennett's-court and Brewer's-yard with Cannon-row, and so on to the Staple. Between the narrow thoroughfare and King-street ran numerous bye-ways, such as (counting southwards) Petitioner's-alley, Rhenish Wine-yard, Stephen's-alley, White Horse-yard, and Clinker's-court. All these, together with the market just south of Clinker's-court, and Lord Rochester's house at the northern apex, have been obliterated by Parliament-street. In tracing the growth and prosperity of Westminster, chroniclers scarcely make enough of the circumstance that its importance must have been much enhanced by the establishment of the Staple, in close proximity to the Minster and the Palace. We read that in 1353, King Edward III. provided for the repairs of the Strand by levying certain duties on the wool and other merchandise carried, be it by water or by land, to Westminster Staple. And, further, that the traffic resulted in such an increase of the rents along the highway that the residents were called upon to themselves pave the rest of the way, whilst the balance was to be spent upon a bridge (*i.e.*, landing-stage, or stairs) near to the Palace and Staple. We read in Mackenzie Walcott's "Memorials of Westminster" (1851) that the Act 27 Edward III., st. 2, cap. 1, made Westminster one of the ten towns in England wherein the staple or market, removed from Bruges, might be held for wool, leather, woolfels (fleeces), lead, and other commodities. The Mayor of the Staple and his Court had a jurisdiction, *ad hoc*, extending from Tot-hill to Temple Bar.

The southern end of King-street opened into Union-street close by Richard II.'s "High Tower," or "High Gate," which formed the north-western entrance into New Palace-yard, and was taken down, *teste* Maitland, in 1706, as "having occasioned great obstruction to the Members of Parliament in their passage to and from their respective Houses." Between Union and Downing streets the following thoroughfares led, westwards, into Delahay and Duke streets:—Bell-alley, George Inn-yard, Blue Boar's Head Inn-yard, Antelope-alley, Gardner's, or Gardener's, lane, Charles-street, Rose and Crown-court (since Crown-street), Bell-yard, Sea-alley, Axe-yard (since Fludyer-street), and Duffin's-alley. It will be seen that of these all from Charles-street to Downing-street are absorbed in the new Foreign, India, Colonial, and other offices block of buildings. Those south of Charles-street may yet be traced, with the exception of George Inn-yard and Bell-alley, which were supplanted by Great George-street, in or about the year 1750. In his New View of London, 1708, Hatton describes Duke-street as "a spacious and pleasant street between St. James's Park, N., and Long Ditch, S., mostly, especially the W. side, inhabited by persons of quality." At that time it really lay between the western ends of Crown-court and Blue Boar's Head Inn-yard. Of the persons of quality, we may instance Matthew Prior,—where the Charles-street steps now lead down into the park; Bishop Stillingfleet, Archbishop Hutton, and Dr. Arnold, the musical composer. To Lord Jeffery's house in Duke-street we recently adverted.* M. I. Brunel had offices here, at No. 18, and dates a letter hence on December 5, 1840. Delahay-street formerly opened into Long Ditch, which, terminating southwards at Broken-cross and the end of Thieven (or Thieves') lane, is now represented by Princes-street. Long Ditch, with a part, now gone, of Delahay-street, marked the course of one of the streams forming the delta of the Aye Bourne, that flowed around Thorn-eye, the island of brake and thorn. It coursed along Gardener's-lane, at the eastern end whereof the water was crossed by a foot bridge, giving said to have been provided by the pious care of the bridge-building consort of King Henry I. A small arm from the river used to run up where is now Great George-street. The name of the quondam Flood-street, between Dean's-yard and Old Tothill-street, recalls the inundations which often visited a site that lay nearly 6 ft. below high-water mark.

* *Vide* the *Builder*, June 5, 1886.

A SANITARY REPORT.

THE substance of this report* is that, while the state of the urban districts is, on the whole, satisfactory, that of the rural districts is as bad as it can be, and that the legislation of the last fourteen years might as well have not been passed. The cause of this state of things is the hostility and indifference to sanitation shown by rural sanitary authorities, who are chiefly composed of farmers. The Medical Officer of the Local Government Board, in condemning the conduct of the rural sanitary authorities, blames the Local Government Board, by implication; for clause 299 of the Public Health Act, 1875, enacts "that when complaint is made to the Local Government Board that a local authority has made default in providing their district with sufficient sewers or with a sufficient supply of water, or in enforcing any provision which it is their duty to enforce, the Local Government Board shall make an order limiting a time for the performance of their duty in the matter of such complaint. If such duty is not performed by the time limited in the order, the Local Government Board may enforce the same by writ of mandamus, or may appoint some person to perform such duty, and shall by order direct that the expenses of performing the same, together with a reasonable remuneration to the person superintending such performance, shall be paid by the authority in default." This provision is a dead letter. At page 318 the report relating to Kingsbridge, Devonshire, is,—"Kingsbridge in same state of bad drainage as when visited by Dr. Ballard in 1882, but a drainage scheme said to be under consideration." A drainage scheme was prepared several years ago and was shelved until after the visit of the inspector in 1885. Since then satisfactory progress has been made in draining Kingsbridge and Dodbrooke, but the Local Government Board could, if they wished, have prevented years of delay. Another cause of complaint is the great amount of circumlocution and delay in getting sanitary improvements carried out. It often happens that when some sanitary improvement is resolved upon, by the time the Local Government Board signify their approval a new Board is elected hostile to the policy of their predecessors, and the proposed improvement is consequently abandoned. Instances of this are numerous. At Birdbrook, near Haverhill, the inhabitants had no water but that which was obtained from polluted wells. Power to borrow 300*l.*, so as to obtain a better supply, was asked for, and in October, 1884, the Local Government inspector held an inquiry in the locality. Months then elapsed, and when the desired consent was granted a new Board had been elected, whose first proceeding was to shelve the scheme of their predecessors. A similar instance took place at Staines with regard to the drainage.

The Public Health Act, 1848, enacted that, upon the petition of thirty, being not less than one-tenth of the inhabitants of any place, or if it appeared from the returns of the Registrar-General that the death-rate of the district for the preceding seven years averaged over 23 in 1,000, an inspector would be sent to hold an inquiry, and if he reported it to be necessary a Local Board should be formed. The Local Government Act, 1858, altered this excellent arrangement by providing that no Local Board should be formed without the consent of a majority of owners and occupiers of the district, thus allowing the sanitary state of a place to depend upon the wishes of a majority of the inhabitants, who often refused to make any improvement.

The Public Health Act, 1848, provided that the Medical Officer of Health and Surveyor should not be removed without the consent of the general Board. The Public Health Act, 1875, repeals that, except as far as regards any officer part of whose salary is paid out of moneys voted by Parliament. Attempts are often made to establish a similar security of tenure, but without any idea that it was for several years in operation. In 1872 another Public Health Act passed, dividing the country into urban and rural sanitary authorities, the rural authorities to be the Boards of Guardians. Medical officers and inspectors of nuisances were to be everywhere appointed, and great apparent activity prevailed. In a short time the salaries of the inspectors were reduced, and things lapsed into their former state. For instance, an inspector of nuisances was appointed for twelve months at a salary of 150*l.*, which, upon the expiration of the time, was reduced to 60*l.* Matters have gone on in the same way ever since. Generally speaking, the salaries and tenures of medical officers are so unsatisfactory that no one cares to undertake the duties. The medical profession have frequently applied to the Local Government Board to alter the terms of their appointments, but without success. The report alludes to the small salaries of Medical Officers of Health and the system of appointing them for limited periods, but does not cast the blame in the right quarter. For not carrying out sanitary legislation excuse may be made for those who are ignorant of its importance and wish to keep down the rates, but for the apathy and neglect of the Local Government Board there is none.

* Report on the Results of a Sanitary Survey made in anticipation of Cholera, 1885-6. By Dr. Ballard. 120 pp. London: Hansard.

MARBLE: ITS USES AS SUGGESTED BY THE PAST.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the meeting of this Institute on Monday evening last,

Mr. William Brindley, of the well-known firm of Farmer & Brindley, read a paper bearing the above title. Mr. Brindley's remarks, the result of notes made during successive and repeated journeys through France, Italy, and South-Eastern Europe, were illustrated by a very fine collection of specimens, besides a large number of photographs and some drawings of pavements and wall decorations.

The author commenced by reminding his audience that the name Marble, from the Greek *Marmairo*,—to g'eam, sparkle,—well applied to the Grecian white marbles, which differed materially from those of Carrara. The Greeks, judging from their works *in situ*, cared only for white marble, with occasionally a plinth, step, or back of a sculptured frieze, of black, adding to its whiteness. Their temples in Sicily confirmed this, being coated with *marmoratum*, a white stucco, made of pounded white marble and lime putty, and rubbed to a fine marble-like surface, examples of which still existed at Girgenti. The Romans had continued the process at Pompeii. The Greek's quarrying was further proof of his love for white, the grandest quarries extant being those of Pentelicus. The ancient marble-pitched slide, for lowering the blocks, still existed on Mount Pentelicus, and a small groove for the conveyance of water from quarry to quarry could still be traced. The vein of statuary in the great quarry pitched into the mountain, where the Greeks had followed it, producing a huge cave, from which they seemed to have obtained their best statuary for sculpture. The *débris* of the floor was now concreted together, the stalagmitic cement being of pure crystalline marble. After a description of the quarry and its marbles, the author mentioned the base rock of the Acropolis of Athens, a solid mass of rich coloured marble, which, although on the spot, had been discarded by the Greeks. The Parthenon and other buildings on the Acropolis were of an ivory-white marble, which, under the blue of an Athenian sky, produced a most grand and impressive effect. Although white marble only had been used by the Greeks, it was not from dislike to colour, but the opposite: to enable them to colour, but the opposite: to enable them to apply whatever colour they chose. Existing remains proved that they used colour and gold freely, and many of the broad Doric mouldings were, he thought, designed specially to receive colour. Whatever his tools and appliances, the Greek had executed as delicate work as could now be accomplished, while he used the drill far more dexterously than any modern workman. The Romans seemed to have introduced coloured

marbles in monumental works after their conquest of Egypt, whence they derived the first ideas of monolith columns. The Romans imported from every corner of their vast empire the grandest and choicest materials for temples and palaces, an example we, as a nation, might well follow. The early buildings of Rome contained few varieties of coloured marbles, the number increasing as the colonies matured. The monoliths in St. Peter's and San Sebastien were cut from the quarry of Porta Santa, as was the immense basin discovered by Mr. Wood at Ephesus. In the ancient quarry in Tunis, which supplied the *giallo antico*, and varieties of rose and orange *breccias*, the Romans had cut a large portion of the mountain away, and one could distinctly see whence they had cut their monolith columns, and hewn them roughly into shape whilst attached to the rock. These quarries had been specially protected by a massive wall, remains of which still existed, together with ruins of the adjoining Roman city, but *no* marble was used in their construction, it being reserved for Rome, where 172 columns of it were still extant. The pavement in the Basilica Julia was mostly composed of it, and also the columns in St. John Lateran, the Pantheon, and the Arch of Titus. Most of the coloured marbles in Italy had, no doubt, been quarried during the time of the Cæsars. The ancient quarries of Egyptian or purple porphyry had not yet been found, for the statements of modern writers as to their locality were incorrect, Syenite granite being mistaken by most of them for the more valuable material. Nothing could approach the purple porphyry in colour, firmness of grain, or durability, and columns wrought 1,900 years ago still retained their freshness of colour. It had been obtainable in very large sizes, only exceeded by the granites of Egypt and the green *Cipollino* of Carystus, which latter was much appreciated by the Romans, for in Rome alone 500 columns still remained; and good Cipollino was now again obtainable. The Romans, who had learned it from the Greeks, retained the employment of marble and the methods of working it just the same until the time of Justinian. When Constantine was converted, the Pagan temples which could not be adapted to the Christian religion had been allowed to decay, and then seemed to become the quarries to supply materials for churches for nearly 1,000 years. In the great sea wall of Constantinople, where it was partly broken down by the sea, columns used for bond could be seen, as well as the upper beds of carved capitals and the lower portions of moulded bases; the carving of the capitals being as beautiful as it was various in design. The Byzantine interiors exhibited most charming examples of marble decoration, and it was instructive to note the small quantity of marble used, it being a thin, yet durable, applied decoration, showing no desire to appear anything different. Several smaller churches in Constantinople, like St. Sophia, showed skill in surface decoration, the walls being covered with oblong panels in tiers of rich marble, framed with narrow white mouldings and bands of a different colour, continuous lines of colour on white being introduced between these panels, while the whole was surmounted by a marble mosaic frieze, with a cornice carved with small sharp triangular shadows. This system applied to St. Mark's, Venice, but at Palermo the marble panels were more elaborately framed with bands of very choice mosaics. The marble balustrade round the gallery at St. Mark's had probably been copied from St. Sophia. At St. Mark's any early carved stone found had been walled in so as to be seen. The marble pavements of Greek temples were probably the earliest, and were usually thick slabs, white, and of large dimensions. The Greeks also perfected the tesselated mosaic pavements; from them the Romans had gained their knowledge, brought to Rome many of the beautiful pavements found in Greece, and becoming proficient themselves in the art, used it throughout their empire, even in Britain; but here, at their departure, it had fallen into disuse until a few years ago. We had to thank French architects for the revival of this art, but modern pavements, owing to cheapness, were very inferior to the ancient: an old *tessera* could be chopped into three modern ones. Good concrete foundations were necessary for the success of these pavements. Some of the grandest pavements were the simplest, as those of the Basilica Julia at Rome, Sta. Sophia, and the one under the dome of St. Mark's. The author differed entirely from those who thought St. Mark's pavement was always undulating or bent as at present: these slabs being sawn from a single block, the waste of working them crookedly would have prevented the markings opening out into one connected pattern; if this pavement were ever repaired, he thought the broken slabs would be found level underneath, and if reversed would produce an even surface. After describing the pavement in the Basilica Julia, the author proceeded with an account of the mosaic pavements of *opus Alexandrinum*, so various and plentiful in Italy, and of which we had a good example in Westminster Abbey. They were usually composed of but few colours, red and green porphyries with white palambino for the mosaics. These pavements had always been made out of old materials, and the variety of geometrical design was truly amazing, some of the most beautiful being in Palermo. The white palambino was a limestone of pot-like texture. The great pavement of Sienna Cathedral, one of the finest Italian Renaissance works, consisted of pictorial subjects, in dark green marble and mastic inserted into thick slabs of white marble. Marble pavements in squares of black and white, introduced about the time of Torregiano, had been largely used, as at King's College Chapel, Cambridge; the Beauchamp Chapel, Warwick; and in domestic work generally. The white tiles came from Italy and the black from Belgium. With the Dutch and Belgians these pavements had never fallen into disuse, and the demand was still great for them. Our Mediæval builders had used coloured marbles very freely in church architecture, the retiring grey Purbeck, Petworth, or Frosterley being used; and their work taught the value of greys, their colour, in arcading for instance, giving distance, but with quiet dignity, holding its own, as something of extra value. The most satisfactory of the altars and monuments of the Italian Renaissance were executed in white marble, with only one colour introduced for the columns, pilasters, frieze pediments, and the panels of base. Polished marbles and stone rarely went well together in the same work, but some marbles,—greys, reds, and Cipollinos,—looked very well dull-polished, and in that state would go better with stone. English alabaster was an excellent economical material to work with marble, and though only used for inferior work, would, if carefully selected, and used where wet would not run over it, be found better than many stones, and keep its colour. It had been used for monumental work from a very early period, and the most delicate work had been executed in it. About the fourteenth century it came into general use in Derbyshire, and during the Elizabethan period was the material most used for important monuments. Memorial slabs of incised marble had preceded brasses, and were far superior to them. The English Renaissance, culminating in the "Adam style," had left us marble work in chimneypieces equal if not superior to anything on the Continent, the designs being good and suitable to the marble, which was usually of the best quality. The onyx marbles of Algeria, Mexico, and California,—of the same nature as Oriental alabaster,—could be cut and ground thin enough for window purposes. At Tarragona Cathedral there were some good examples in orange-yellow Oriental alabaster, and also at Orvieto; almost any marble with crystalline statuary ground an inch thick, placed on the sunny side of a church in Italy, would admit enough light for worship, but would not do in England, with its variable climate. Great Britain and Ireland contained many varieties of well-known coloured marbles, but they were little used in comparison with foreign marbles, on account of the bad quarrying and high railway rates. If consistent detail were used, Carrara marble might be employed for public buildings. A marble to stand exposure to the weather should be close, hard, and vitreous looking, plenty of which could be selected. The mouldings used in the palaces of the Cæsars and other important buildings in Rome were usually very simple, and looked well in marble, costing less than many modern ones which were designed forgetful of the mason's method of work. Mouldings also needed to be drawn specially to suit the colour. Marble linings, when possible, should be fixed hollow at the back, and a few small places left open in the joints until the solid walls were dry, the hollow allowing the slab to keep a little warmer than the wall, thus avoiding condensation. In the British Museum, the South Kensington Museum, and other similar collections, were some fine examples of ancient coloured marbles, but they were seldom distinguished by names, and when they were, the names were generally incorrect. In the University Museum at Oxford was one of the finest collections of specimens known, but they had been for years in a dark corridor where it was next to impossible to see their colours. In France, coloured marbles were appreciated as objects of beauty, the same as fragments of sculpture, the collection in the Museum of the Louvre being, in the author's opinion, the most instructive known. Mr. Brindley concluded by referring to the useful arrangements of the Museum of the French School of Mines, where the wall space was divided to represent each geographical department, thus enabling one to see at a glance everything geological in each Département likely to be of use, viz., its earths, sands, clays, limes, stones, marbles, and granites.

[For a report of the discussion which followed see p. 927.]

OBITUARY.

Mr. James Collis.—The death is announced of Mr. James Collis, late District Surveyor of Lee, Charlton, and Kidbrooke.

Signor Enrico Terzaghi. — The death is announced of Signor Enrico Terzaghi, a Member of the Academy of Fine Arts of Milan. His parents were in humble circumstances, and were engaged in the furniture trade. He was educated at the Academy of which he afterwards became a member, between the years 1820 and 1830, and carried off several prizes in the competitions organised by the Academy. He received his first instructions in practical architecture from Signor Moraglia, a Milanese architect of some repute, and assisted him in carrying out several of his works. He afterwards commenced practice on his own account, and built several churches in Milan and its suburbs, among which may be mentioned the Church of St. Gioachino, one of his latest works. Among his secular buildings may be noticed the Patronata for the Society for Relieving Discharged Prisoners, the Savings Bank in the Via St. Paolo, the Hôtel Branca in the Via Borgonuovo, and the Hôtel Grondona in the Corso St. Celso. He was a member of the Commission for the restoration of the basilica of St. Eustorgio and the Church of St. Eufemia, and also for the completion of the Church of St. Fedele. His body was followed to the grave on the 29th of November by a numerous concourse of artists, friends, clients, and a small number of relations.

Professor Sacchi.—The *Politechnico* of Milan publishes in its current number the funeral oration pronounced over the grave of Professor Cav. Archimede Sacchi, an architect and writer on architectural subjects, and a former contributor to the *Politechnico*, who died at Milan in July last. He was a pupil of the architect Balzaretto, but does not appear to have seriously practised his profession. He will be best remembered by his two works "*Le Abitazione*" (Dwelling-houses) and "*L'Economia del Fabbricare*" (Economy in Building), which have passed through several editions. He restored the Castle of Sartirana and the Palace of Arengario at Monza. He made a design in 1863 for a new western front to the Church of Sta. Maria del Fiore at Florence and another design for a cupola for the cathedral at Pavia. Cav. Sacchi, who was in his forty-eighth year, was Professor of Architecture at the Academy of Fine Arts at Milan, a member of the Communal Council, a member of the Commission for Public Buildings for Milan, and a member of the Provincial Commission. He was also Vice-President of the Milanese Institute of Architects, who propose to commemorate his memory in a special manner.

Didsbury.—Christ Church has been presented by Mr. William Roberts with a new clock and carillon, by Mr. J. W. Benson. The escapement is Graham's dead beat. Time is shown on three copper dials, 4 ft. 3 in. in diameter; the hours are struck on a tenor bell of 18 cwt., and the Cambridge quarters are chimed on four smaller bells, the striking being by improved rack repeating work. The carillon or chiming machine plays seven tunes, on eight bells, at intervals of three hours, and is entirely automatic.

THE LAYING OF MAINS AND PIPES.

A Bill has been brought in by the Metropolitan Board of Works to remedy a defect in the Metropolis Management and Building Act (Amendment) Act, 1878, with regard to the subsoil of streets, and to regulate the laying of mains and pipes in the metropolis. It has been found that while the abstraction of gravel from the sites of buildings can be prevented, there is at present no power to prevent the sites of new roads being excavated, the gravel or other material being removed, and the excavation filled up with objectionable materials. The Bill proposes to prohibit the forming or laying out of any street without the consent of the Board over land where the sand, gravel, or subsoil has been removed, and it shall not be lawful to remove any sand, gravel, or subsoil from land over which it is proposed to form any new street, or over which any such new street has been formed, without the consent of the Board; and the Board in giving their consent may impose any condition they may think fit for the purpose of securing stability and protecting health. The consent of the Board is not required where no more of the surface soil has been removed, or is intended to be removed, for the purpose of forming a foundation for the paving, metalling, or flagging any street, road, passage, or way.

Any person contravening the Act is to be subject to a penalty not exceeding 5*l.* for the first offence, and to a continuing penalty of 20*s.* a day for every day during which the offence is continued.

As the Bill was originally drawn, the District Surveyors were to enforce the conditions imposed by the Board, and were to be paid such fees in respect of their supervision as the Board might appoint, and such fees were to be recoverable in the manner provided in the 51st section of the Metropolitan Building Act, 1855; but in the Bill as revised the enforcement of the Act is placed in the hands of the several Vestries and District Boards.

Complaints have been made to the Metropolitan Board by the various Vestries and District Boards that by reason of the gas mains and water pipes in the metropolis being laid at an insufficient depth below the surface of the streets, the Vestries and District Boards have been made liable for damages occasioned by injury to these pipes by steam rollers employed to level the macadam of the roads. To remedy this state of affairs, it is proposed by the Bill that mains or pipes shall not be laid in any new street, nor any mains or pipes relaid or renewed without the approval of the Vestry or District Board. The Vestry or District Board in giving their consent may impose conditions with regard to the depth, position, and course of any mains or pipes, subject to an appeal to the Metropolitan Board of Works. The penalty proposed for any infraction of the law is 5*l.* for the first offence, and 20*s.* a day for every day that the offence continues.

The short title of the Act is the Metropolis Management Acts (Amendment) Act, 1887.

Illustrations.

FIREPLACE IN THE GUARD-ROOM, MONT ST. MICHEL.

A SHORT time ago we gave an illustration of the proposed exterior restorations on Mont St. Michel; we give here a sketch of the fireplace in the interior of the guard-room, from a sketch by Mr. E. Jeafferson Jackson. The effect, it will be seen, is obtained entirely by the mouldings, which are deeply undercut, and give strong and effective lines of shadow. The ornamental cresting, as it may be called, is not very well designed for its situation, and it may be doubted if the work would not be better without it.

NORTH CHANCEL AISLE, AMIENS.

This bit of thirteenth-century work from a great building is also by Mr. Jackson, the author of the last-mentioned sketch.

BRAID U.P. CHURCH, EDINBURGH.

This church, at present in course of erection from the designs of Mr. G. Washington Browne, occupies an important site in a rapidly-rising suburb. The object aimed at in the plan is to ensure the most favourable conditions for preaching, and this is accomplished by arranging the seating so that every worshipper sits directly facing the pulpit, while all corners and obstacles to direct seeing and hearing are avoided. To make the building a more perfect auditorium there is a rise of 2 ft. upon the floor from front to back, and the ceiling is slightly domical. The materials employed are local red sandstone for the rubble walling, with Prudham stone dressings; the roof is constructed of iron principals and purlins, and covered with Westmoreland green slates; the internal walls are plastered, and the seating is formed of selected yellow pine.

The church is seated for 750 people, and the cost, including hall to seat 250 persons, session-house, vestry, boundary walls, heating, lighting, &c., is estimated at 5,000*l.* Messrs. Wm. Beattie & Sons are the principal contractors, and Mr. Wm. Bruce is the clerk of works.

CHURCH OF ST. FRANCIS, ASHTON GATE, BRISTOL.

The materials of this church, of which we give a view, are local stone for the walls, with Cattybrook bricks for all dressings and inside facework, the columns of nave, window-cills, and tracery being of Bath stone.

The roofs, which are to be open-timbered (except the chancel, which will be boarded and divided into panels), are to be covered with Broseley tiles; gangways and chancel-floor are to be tiled, and windows are to be fitted with rolled cathedral glass.

The heating and lighting will be an addition to the cost (about 5,000*l.*, including boundaries) as well as fittings of every kind. The church will accommodate 750.

The architect is Mr. John Bevan, of Bristol, who is carrying out this and some other churches under the Bristol Church Extension Commission.

MISSION ROOM, KIRKLAND.

Kirkland is a small mining village in the parish of Lamplough, Cumberland, and, as is frequently the case in the mountainous districts, one or two miles away from the parish church.

The room is intended to be used for both secular and religious purposes. When the service is secular the chancel is shut off by revolving shutters.

The walls are built of local limestone in squared rubble-work, and are practically, above the window-cills on each side, nothing more than buttresses. This proved to be a very cheap plan, for the entire cost of the building, which has seats for 280 people, was, inclusive of fittings, fences and gates, and architect's commission, under 600*l.* The architects are Messrs. T. L. Banks and Townsend.

AMERICAN VILLA ARCHITECTURE.

These are three examples of modern American villa architecture. The cottage at Newport, designed by Mr. Luce (not Lace, as printed in the illustration title), owes evidently a great deal to English architectural fashions; that above it, at Elberon, is an example of what may be called the new American school of domestic architecture, which is striking out a form and feeling of its own. The summer residence at Bar Harbour, the upper of the three illustrations, derives its character mainly from the fact that its principal portions are entirely of timber and shingle, and are treated accordingly. This being a seaside villa, the architect seems to have had the rather happy idea of giving a kind of lighthouse effect to the prominent feature of the house, in keeping with the *genius loci*.

The illustrations are drawn from photographs by Mr. A. B. Johnson.

GREAT NORTHERN CENTRAL HOSPITAL.

In 1884 the Committee of this Hospital invited five architects to submit designs for their projected new buildings in the Holloway-road. The result of this competition was that the design submitted by Messrs. Young and Hall was awarded the first place, and they were appointed architects to the new building.

The original design submitted included three circular pavilions, two of which were three stories in height, the third being only two stories high and being intended for future extension. The upper floor of one of the larger blocks was occupied by the operation theatre and small wards for special cases. The out-patient department was much smaller than the one now proposed, and was arranged on two floors.

After much consultation between the Committee and the architects, it was decided to provide accommodation for the whole number of patients (150) at once, to build one circular and one rectangular pavilion, the wards in each pavilion being identical in point of floor area, wall space, and cubic space, and to considerably enlarge the out-patient department, which was to be wholly on the ground floor.

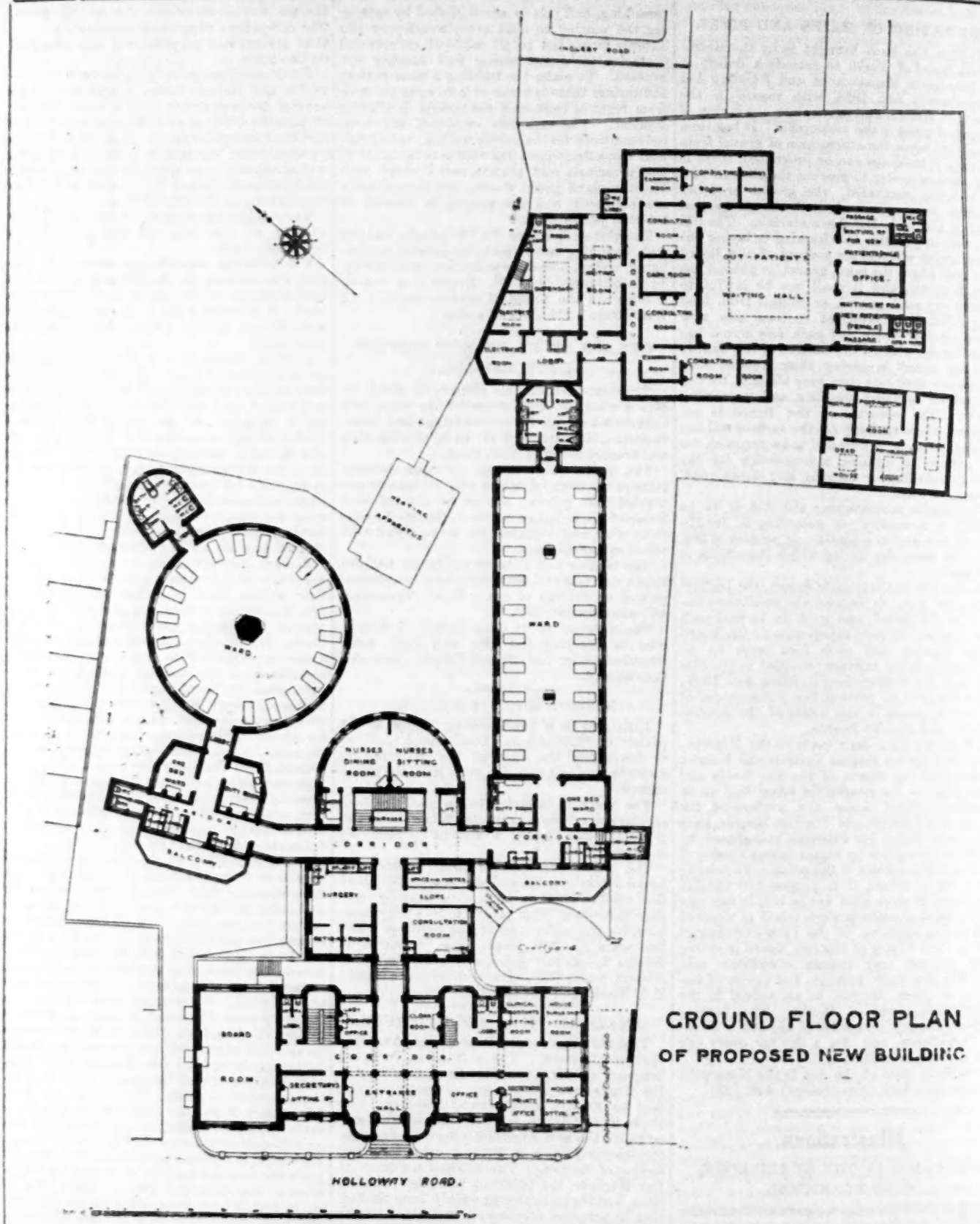
The design we illustrate to-day is the one adopted on the lines of the modifications described above.

The buildings may, for purposes of description, conveniently be divided into:—1. Front administration block; 2. Back administration block; 3. Circular ward block; 4. Rectangular ward block; 5. Out-patient department; 6. Mortuary.

1. *Front Administration Block.*— Basement contains porters' room, stores, and coals. Ground-floor: Entrance-hall, board-room, secretary's office, lady superintendent's office, secretary's, physician's, surgeon's, and clinical clerk's sitting-room. First floor: Sitting-room and bedroom for lady superintendent, sitting-room for paying patients, twelve bedrooms for ditto, and one nurse's room. Second floor: Eight bedrooms for paying patients and sitting-room for ditto, one nurse's room, six bedrooms for staff, pantry, bath-room, &c. Third floor: Nurses' bedrooms with bath-room, &c.

2. *Back Administration Block.*— Basement: steward's office, and stores, with lifts, wine and beer cellars, main staircase, and passenger lift, linen-room and store, and way to out-patient department under rectangular ward block. Ground-floor: In-patients and casualty entrance, surgery, with examining-rooms; consultation-room for medical staff; main staircase, with corridors right and left to ward pavilions; nurses' dining-room and sitting-room, with pantry attached. First floor: Bedrooms for nurses, main staircase, operating theatre, surgeons' room, and chloroforming-room. Second floor: bedrooms for nurses, main staircase, mezzanine, bedrooms for servants. Third floor: kitchen scullery, larder, servants' hall, main staircase. The lift is brought up to this floor to enable patients to be taken out to the flat roofs over the ward blocks.

3. *Circular Ward Block.*—Under the ground-floor is an open basement, 5 ft. high. Ground floor, entering from main corridor: recess for basket for soiled linen, cupboard for food, way out to balcony. The balconies are specially arranged so that patients in bed can be wheeled out on to them direct from the wards. Cupboards for linen and patients' own clothes, water-closets, and slop-sink, duty-room, and one-bed ward. The connecting lobby between the duty-room block and ward is a covered bridge, 7 ft. 6 in. high, with clear space between its roof and the floor of the lobby above. Ward for twenty beds, 57 ft. 6 in. diameter, 12 ft. 6 in. high at external wall line, rising to 13 ft. 6 in. high at central shaft. Wall space per bed, 8 ft. 6 in.; floor area, 123 ft. 3 in. per bed; cubic space per bed, 1,613 ft. These figures are exclusive of space occupied by the doorways. Each ward is warmed by three of D. O. Boyd's hygiastic ventilating stoves, placed on three sides of the hexagonal chimney-shaft. Fresh air is brought up from below to the back of each stove, and extraction-shafts are carried up from openings at the ceiling level on the remaining three sides of the hexagon. The shafts to each ward are entirely distinct, and are carried by fire-clay pipes with the smoke flues. The warming power of the stoves is supplemented by hot-water pipes running round the ward, which are so arranged that the water can be shut off except when required for use, and it is not anticipated that this would be the case except in the most severe weather. In addition to the windows, which are double-hung sashes with hopper lights above, fresh air is admitted at the floor level by Ellison's patent ventilators. The floors will be constructed of iron joists and concrete, and solid wood blocks, the precise nature of which is not yet settled. The lobby connecting the wards to the closet and bath-room block is constructed in the same way as that connecting the ward block with the duty-room block already described. The w.c. block contains two water-closets, a sink-room, and bath-room, with four lavatory basins. The walls of this block are lined throughout with



GROUND FLOOR PLAN
OF PROPOSED NEW BUILDING

Plan of the Great Northern Central Hospital.

glazed bricks,—and the bath-room is warmed by hot water.

4. *Rectangular Ward Block.*—Under the whole of this block is a basement, the floor of which is on the same level as the basement of the back administration block. This basement, which is quite open at the sides, forms a covered way from the administration and wards to the out-patient department and dispensary.

The duty-room block is similar in all respects to that of the circular ward block, except that the intervening lobby is in this case omitted.

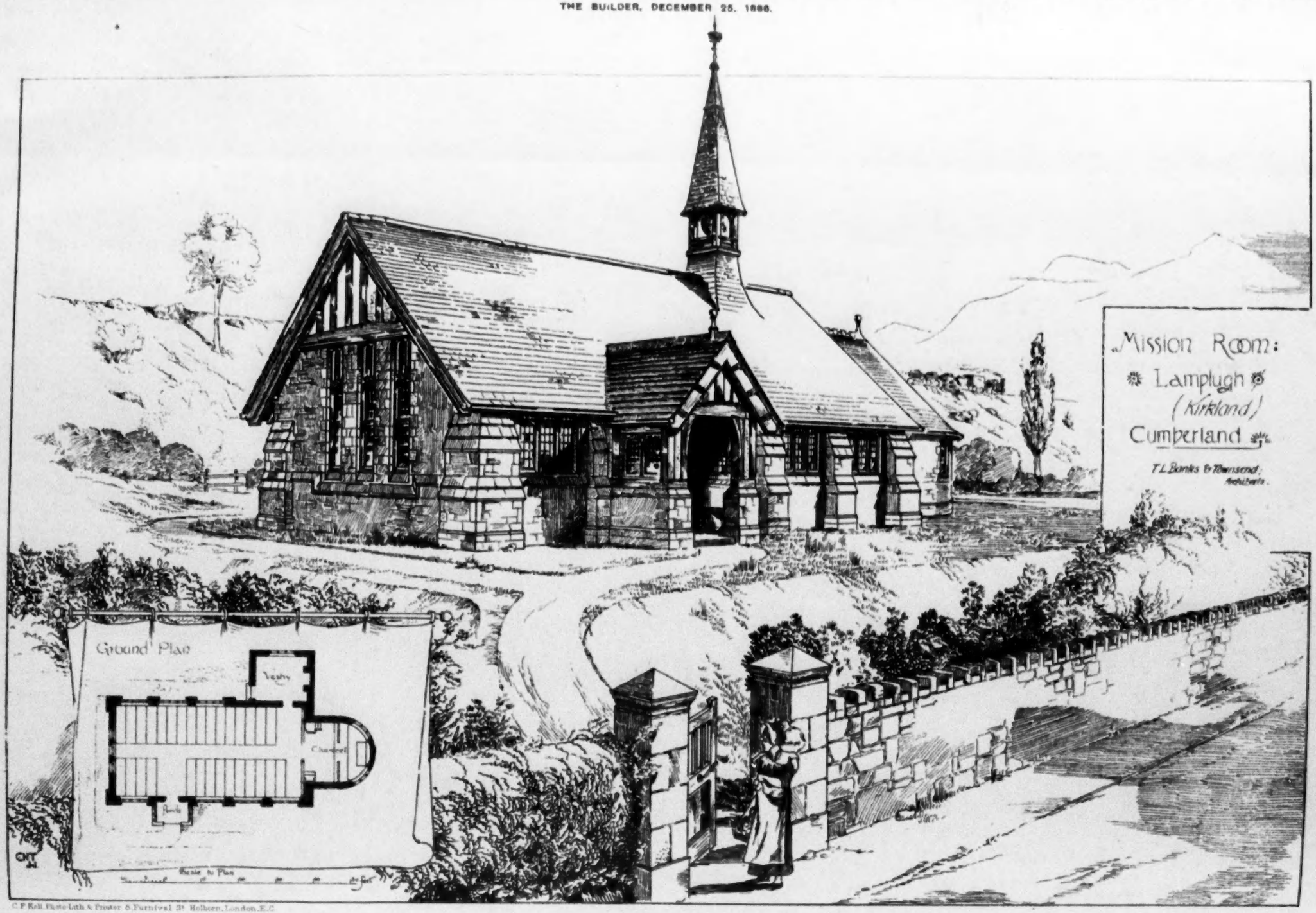
In the rectangular ward the wall space, floor area, and cubic space are the same as in the circular wards. The water-closet and bath-room block is arranged in a similar way to that of the circular ward block.

5. *Out-Patient Department.*—The entrances for out-patients are placed at the north-east, for the reason that the committee contemplate the possibility of obtaining an entrance at some future time from the Manor-road. The male and female patients enter at separate doors into small waiting-rooms for new patients. Separating these waiting-rooms is an office with an entrance to each room and also to the large waiting-hall. The main waiting-hall has seating accommodation for over two hundred patients, and is divided centrally by a gangway, one side being reserved for male patients, the other for females. The closets, &c., for each sex are separately arranged. The consulting-rooms are four in number, and to each is attached an examining-room. In addition to these is a room for ophthalmoscope work, accessible to two of the consulting-rooms. The exit from the consulting-rooms is into a passage which leads directly to the dispensary waiting-room. This passage is only 7 ft. high, and the rooms abutting on it have both vertical and top lights over its roof. Adjoining the dispensary waiting-room is the dispensary, with dispenser's and electrician's rooms, &c., and drug-store under. On the hospital side of the dispensary is a lobby for serving out medicines, &c., for the in-patients.

6. *Mortuary Block.*—This contains museum, room for pathologist, *post-mortem* room, dead-house, and mortuary chamber.

The front of the Administration Block is to be faced with red brick and terra-cotta, the rest of the buildings with plain stock, with red brick arches.

The contract for the entire buildings was taken by Messrs. Brass at a cost of 40,300*l*. Of this the Committee have up to the present arranged to carry out the back part of the administration block and the rectangular ward block. The remainder is postponed until the necessary funds have been obtained.



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UNITED PRESBYTERIAN CHURCH, BRAID, N.B.—Mr. G. Washington Browne, Architect.

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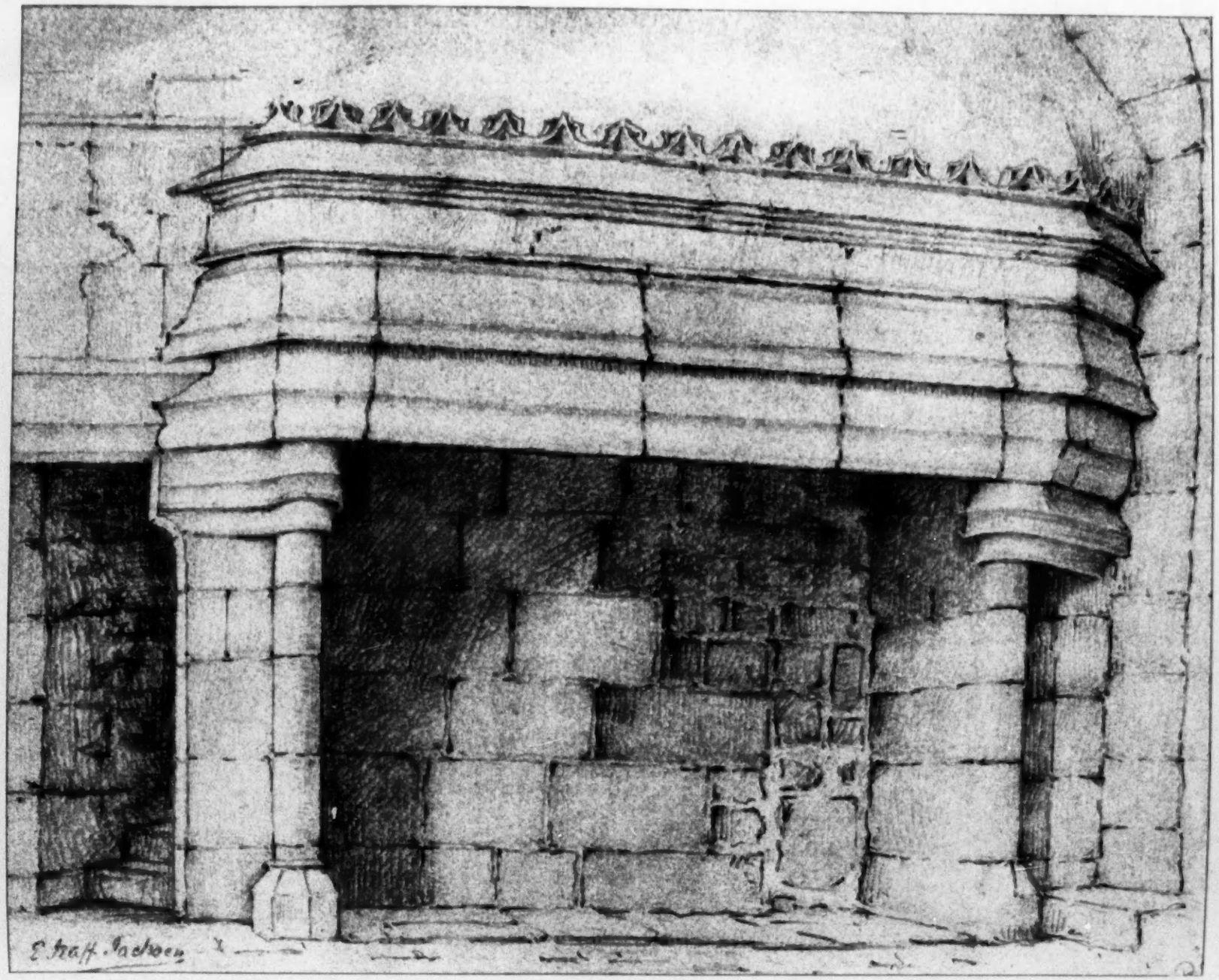
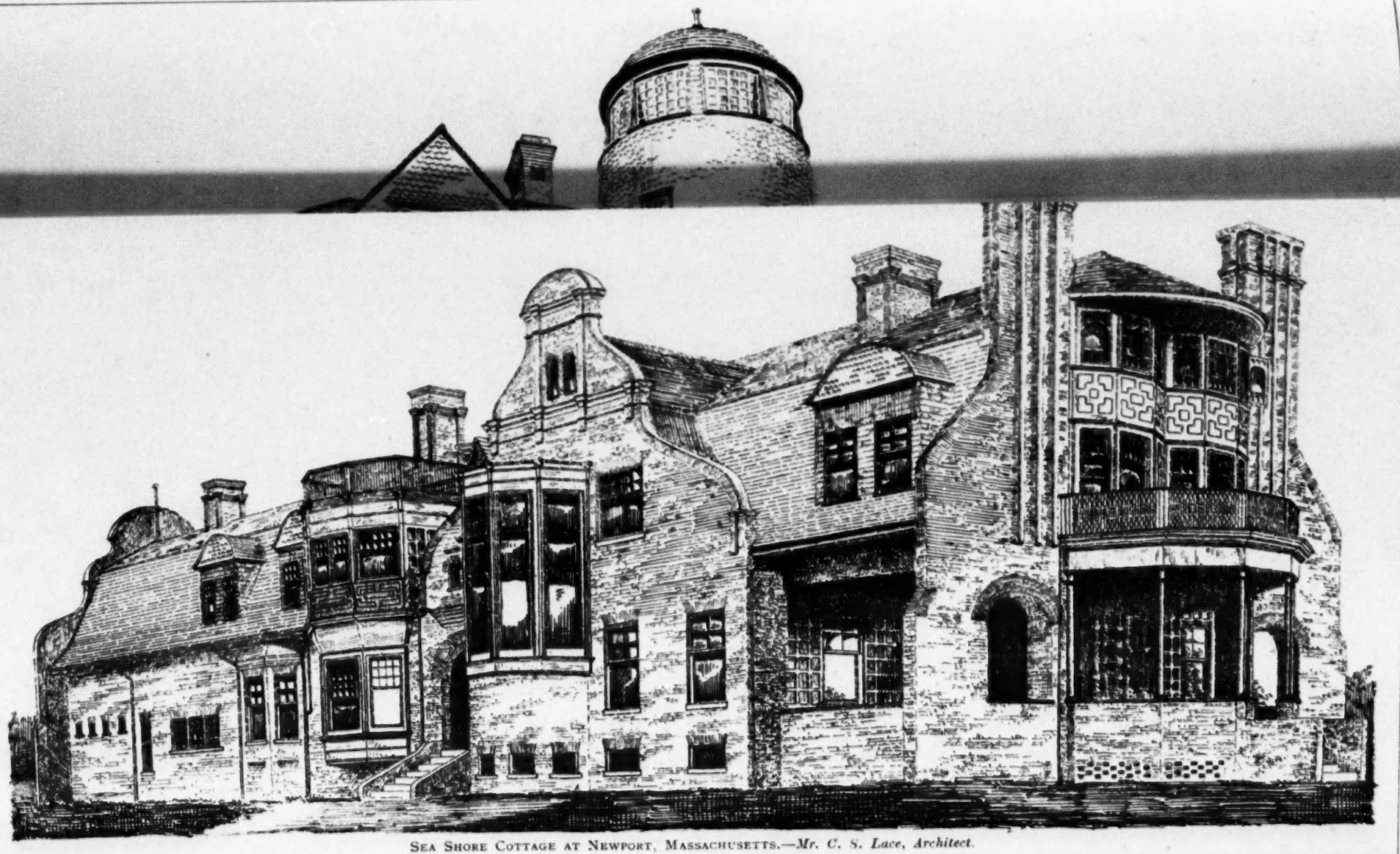


"INK PHOTO," SPRAGUE & Cº. LONDON.

THE FIREPLACE IN THE GUARD ROOM, MONT ST. MICHEL.—FROM A DRAWING BY MR. E. JEAFFERSON JACKSON.



SEA SHORE COTTAGE AT NEWPORT, MASSACHUSETTS.—*Mr. C. S. Lace, Architect.*

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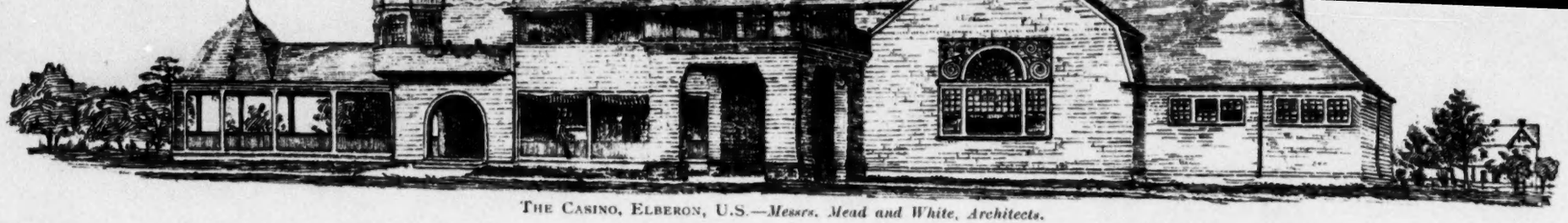
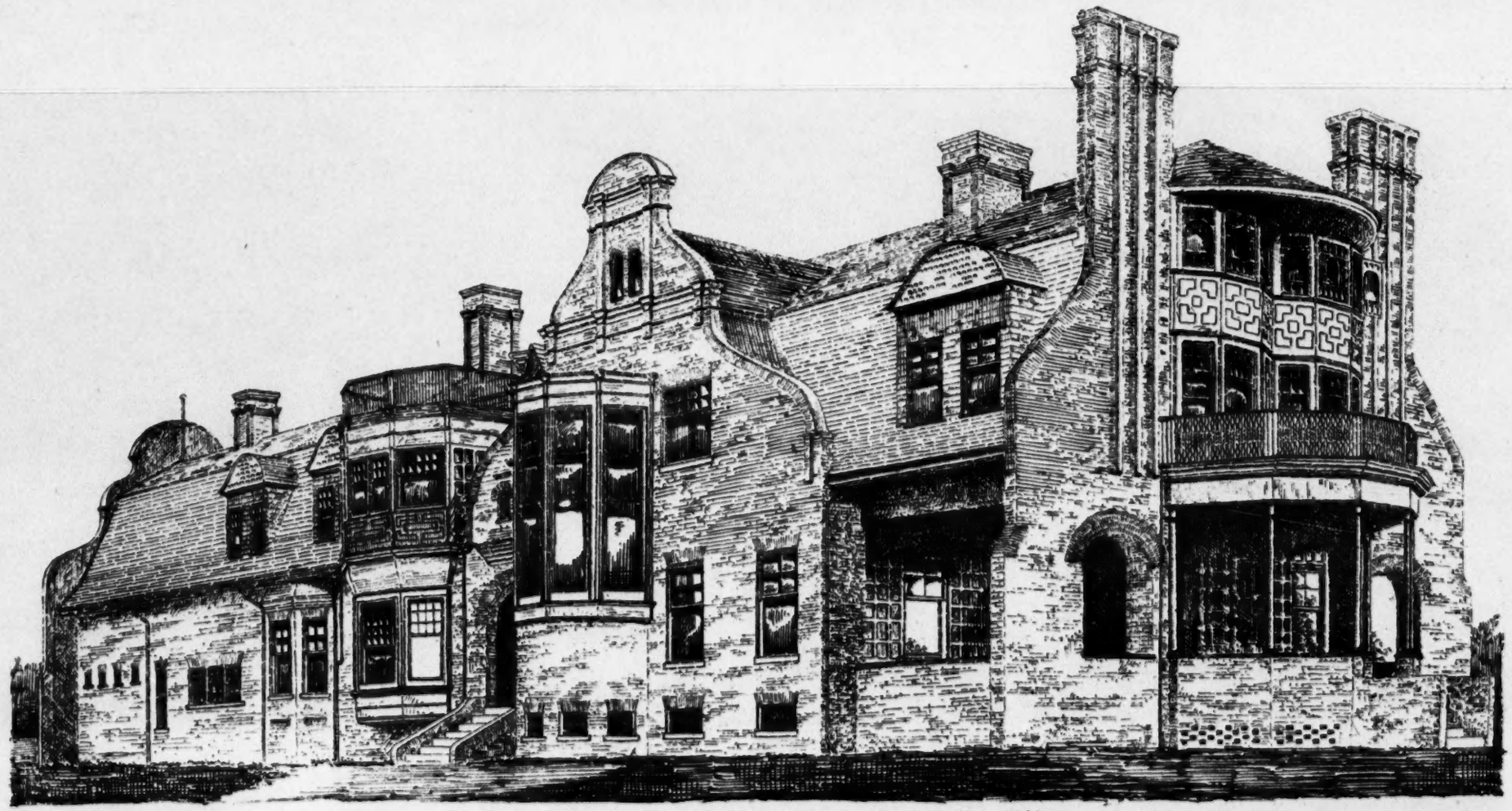
THE FIREPLACE IN THE GUARD ROOM, MONT ST. MICHEL.—FROM A DRAWING BY MR. E. IRAPPERSON JACKSON.

SUMMER RESIDENCE BAR HARBOUR, MASSACHUSETTS.—*Mr. W. R. Emerson, Architect.*

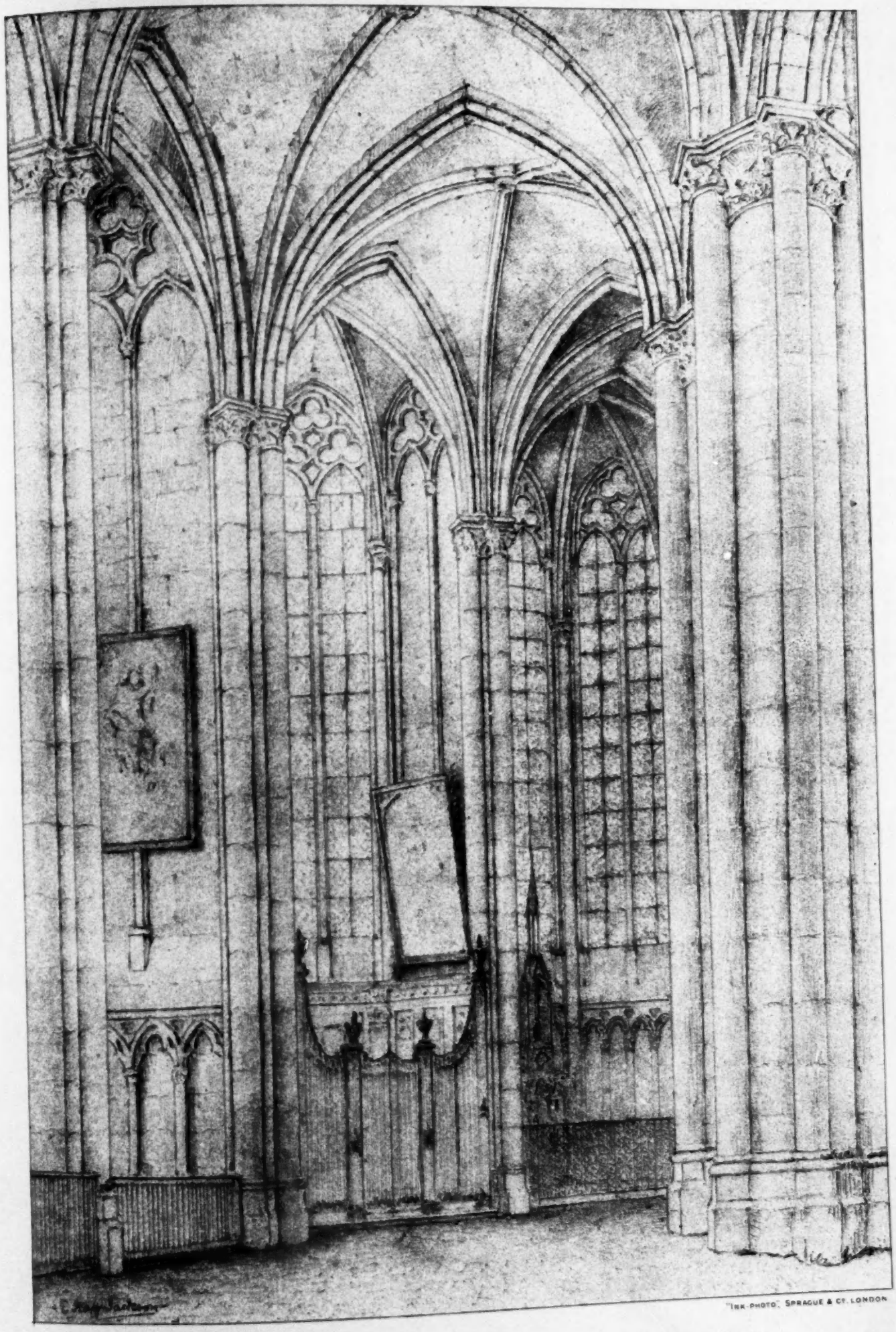


THE CASINO, ELBERON, U.S.—*Messrs. Mead and White, Architects.*



SEA SHORE COTTAGE AT NEWPORT, MASSACHUSETTS.—*Mr. C. S. Lace, Architect.*

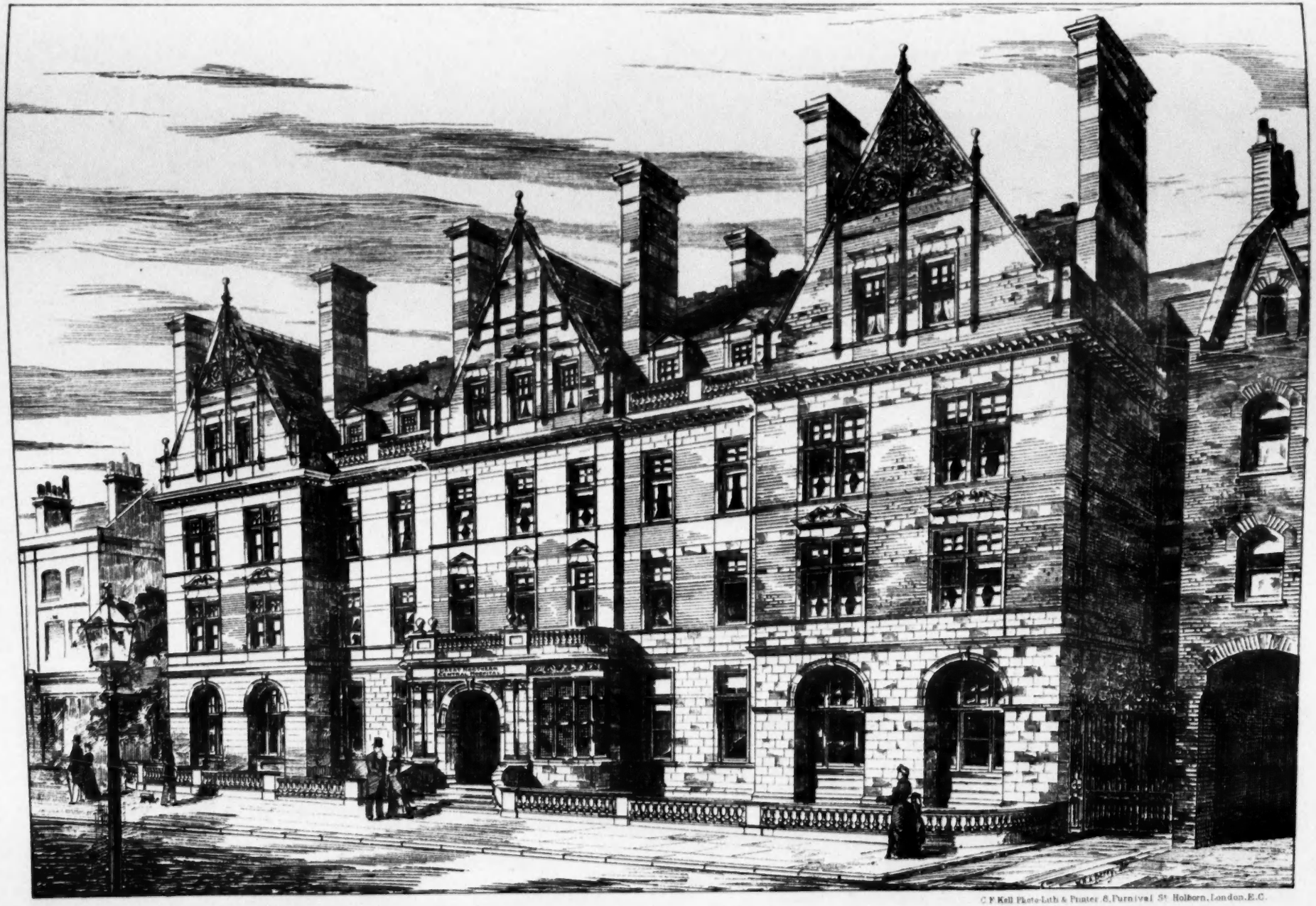
"PHOTO-LITHO" SPRAGUE & Cº. 22, MARTINS LANE, CANNON ST. LONDON, E.C.



"INK-PHOTO," SPRAGUE & Cº. LONDON

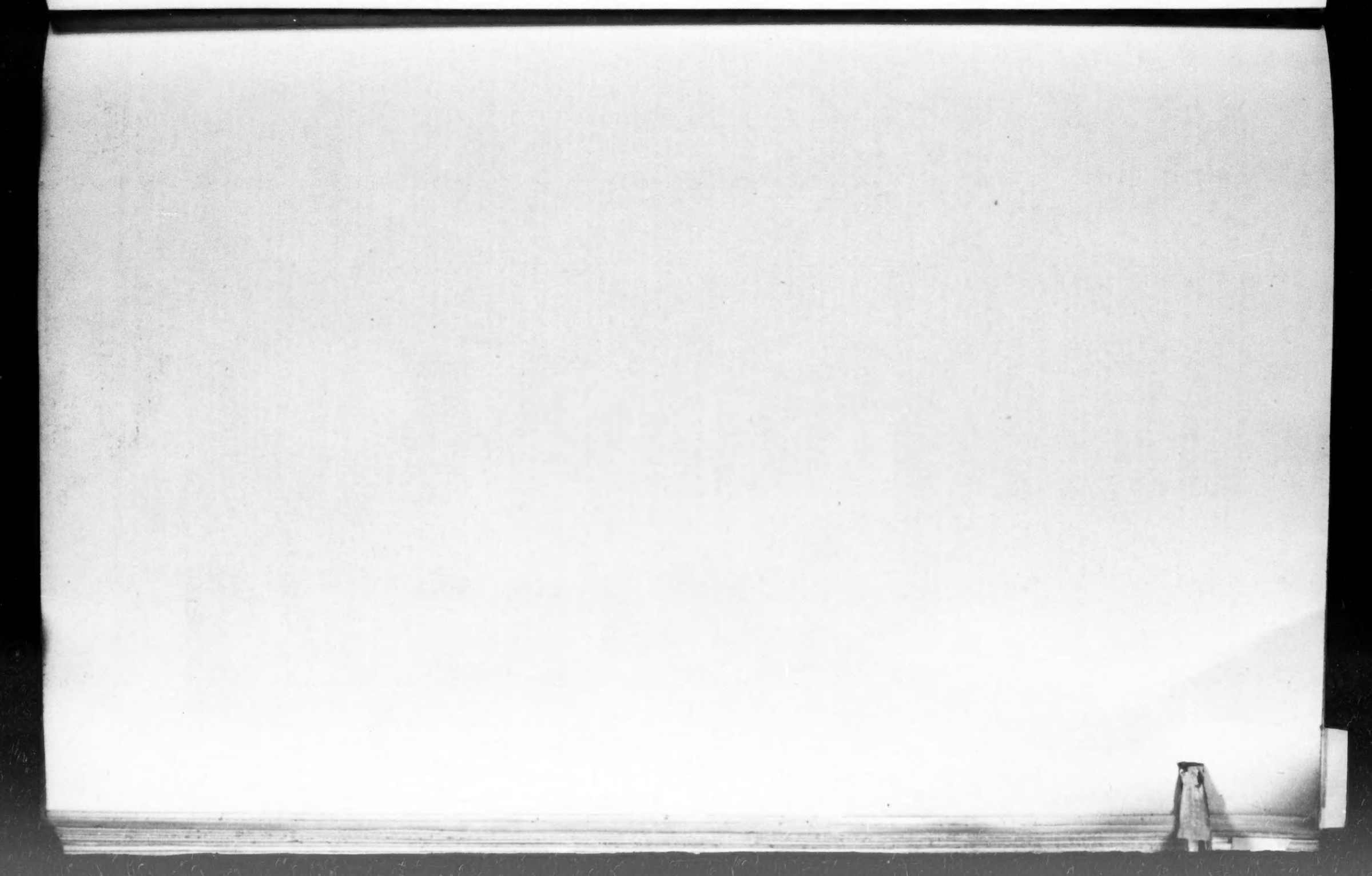
NORTH CHANCEL AISLE, AMIENS.—FROM A DRAWING BY MR. E. JEAFFERSON JACKSON.

CHURCH OF ST FRANCIS, ASHTON GATE, BRISTOL.—Mr. John Bevan, Architect.



C.F.Kell Photo-Lith & Printer 8, Furnival St Holborn, London, E.C.

GREAT NORTHERN CENTRAL HOSPITAL.—Mr. Keith D. Young, F.R.I.B.A., and Mr. Henry Hall, A.R.I.B.A., Architects.



DECORATIVE METAL WORK.

AT the meeting of the Architectural Association on the 17th inst., the following paper on this subject was read by Mr. H. Longden :—

In dealing with the subject I have chosen for to-night's paper, I wish to restrict the metals of which I shall treat by omitting gold and silver, as, though they have been used decoratively, as in the Pala d'Oro at St. Mark's in Venice, and various shrines of gold and silver which have perished, such as St. Cuthbert's, in Durham; St. Alban's, in St. Alban's Abbey; St. Thomas's, in Canterbury; and St. Edward's, in Westminster Abbey; their use has not been extensive, compared with the use of other metals, and I have no experience of this.

The use of metal work in decoration, both as fixed in buildings and in useful movable articles, is most ancient, and we have records of the use of bronze very extensively in ancient Greece and Rome.

In the total destruction of the civilisation of the Ancient World the bronze so used was mostly melted, and we have few remains of it. This is much to be regretted, as, except gold, this is the most enduring metal, and is susceptible of the finest work which the modeller or sculptor can bestow upon it, besides being capable of treatment by the chaser's art.

It has the great virtue of tenacity, so that cast work in this metal may have thick and thin places, such as cast iron, and, to some extent, cast brass, will not allow without cracking.

By the process of "coring," by which is meant making the casting hollow by putting inside the sand mould a reduced and generalised copy of the figure, vase, candelabrum, capital of a column, or whatever may be the subject of the casting, leaving a thin space between the "core," or reduced copy of the article, and the outer envelope of sand, called the sand mould, the whole casting may be made of about equal thickness all over, so using less metal and saving expense, which is an object not to be lost sight of, besides other advantages.

Some very fine examples of bronze work are shown among the drawings*; the statue of Colleoni, by Verocchio, is by that great man who was architect, sculptor, bronze founder and finisher (which in those times were the same thing), and painter. The band of bronze ornament round the pedestal shows what might be done by sculptors now if they called in architects to help them with the pedestals of their statues.

Another example is an interesting triangular pedestal for a statue, with a band near the top and another near the base, of bronze. This is all Italian work.

The best example I can refer to of this work in England is the gates and the enclosure of the tomb of Henry VII.'s chapel in Westminster Abbey. The construction of the great gates of the chapel is curious. There has been made a frame of wood forming large squares which is covered at the front and back with cast bronze mouldings, and the interiors of these squares (so to speak) are made of thin open-work castings, with devices of the rose, portcullis, &c., suitable to the place and founder.

The screen round the tomb is differently made, not having the wood internal construction, and the gates of the screen are made of bronze castings only, ingeniously fitted together, as it was evidently not convenient to make very large castings.

The work on the tomb is very fine, and shows the change in style, from the latest Gothic in the gates and screens to the Renaissance in the tomb, in a most interesting way. There is some other fine bronze work in the Abbey, but I must not dwell upon it.

I do not attempt to speak of bronze statue founding, as that is a subject in itself. Mr. Simonds, the sculptor, lately read a learned and instructive paper upon this subject before another society; and it requires some one with skill such as his, which I do not possess, to treat this subject.

I wish to plead for the use of this metal more in architectural work. I have seen it used with marble in recent work with the happiest effect. It is a metal which is beautiful if left in its own golden tone, and which in changing from this tone never becomes ugly. It will take gilding perfectly, and will take various patinas, the green, the brown, the black; and, when used with marble of fine contrasting colours, produces effects which cannot be had so well in any other way. It lends itself best to decoration of the finest and most monumental work, and, if the tendency to greater refinement in style which I seem to observe in the works of the best architects continues, I have no doubt that this metal, with its mellow and grave tones, will be more used and valued.

Our neighbours the French have been skilled in the use of this metal for many years; indeed, they may be said never to have ceased using it since the time of Cellini.

We have scarcely used bronze for many years, but there is no reason why we should not, and there is every reason why we should, I venture to think.

I am happy to say that in our great Cathedral, St. Paul's, in this city, some bronze work gilded is to be used in the new reredos which is being put up, and I hope this will only be the prelude to the more extensive use of this metal for which I have pleaded.

Brass is a metal for which no pleading is necessary. It has been adopted very widely in the last thirty years. I can remember when brass was thought rather vulgar. It was used for door and other knobs, for very every-day candlesticks, window-fastenings, and things little thought of.

Among the many changes made by Pugin, whose name must ever be honoured by us, it was discovered that brass was a metal which had a beauty of its own, and that it could be applied in many ways to decoration in public buildings, churches, and houses.

We have all seen the "Mediæval gas fittings" which, if they became painful and at last almost odious, began in the fine work of Pugin, and, as he used the metal, were beautiful and useful.

At the same time, I must confess that the feeling of softness which the special smoothness and polish which brass will take seems to me to call for in design, was not so thoroughly studied when it was first reintroduced among us as it ought to have been.

I have the pleasure of showing you some examples of this metal in very happy treatment, some of them kindly lent to me and some belonging to myself.

As exemplifying the great beauty of softness and rounded contours with great delicacy in curves and the very fine detail, some of it almost imperceptible, which the skilled turner knows how to give to his work, I have here a thick low candlestick, probably Dutch, which is one of the finest examples of this kind of work I have seen. A small candlestick here, too, of a not uncommon Dutch type, but very good in its profiles, is a good example of the softness.

The Italian candlestick shows fine contours and turning, with bold chasing of a good Renaissance type, and an interesting tripod foot, with the arms of the donor or owner of it let in in silver.

Two brass dishes here are examples, one of Venetian engraved work, full of subjects, and the other of hammered raised work, showing a coat of arms, with mantling, probably of Italian work.

The Persian jug has fine form, and delicate engraving covering the jug with diaper. The handle, in the form of a serpent, is well designed.

The brass fire-irons of old Dutch make are in bold Renaissance style, and the warming-pan and the simple English brass dog of a very traditional form, applied both to iron and brass, with variations suitable to the material, show various uses for brass, all good and characteristic.

The double-branched candlestick is a good example of what I take to be Flemish beaten work. It cleverly treats a design which almost suggests solid cast work without attempting what sheet brass will not do, and it has an advantage in its lightness for its purpose of hanging on a wall.

The oval basin or dish is good Italian work, and it excels in the specially Italian way of getting good effects with broad and simple means.

The brass plate with a figure of William of Orange is Dutch work, and dates itself 1696. It has a bust of William with the orange branches and Fame blowing her trumpet over his head. The form of it is like that of the firebacks in cast-iron which were put behind the wood-fires down upon the hearths, and my idea is that the Dutch housewife, who was very patriotic and very tidy (two great Dutch characteristics), had this made to cover up the iron fire-back in the summer when no fire was wanted, and it would look very resplendent, as you may see, when standing down on the hearth of a wide open and lofty fireplace, and surrounded with clean, fresh-looking Dutch tiles in a spotless room.

I have not much here to show the brass balustrades, which are a special feature in screens to choirs and chapels in churches in Belgium and Holland. They have a very rich and beautiful effect, whether used with wood or with marble, and they agree well with buildings and fittings of the fifteenth century, or any later style.

A modern example of this is in the chapel of Castle Howard, where an oak screen has a balustrade and panels of brass work in it, and the effect is sumptuous.

Mr. Norman Shaw has used a brass balustrade in a house in Cheshire as part of a screen between a saloon and a corridor, with shutters behind the balustrade, so that the screen may be an open or a closed one at will.

At Hal, in Belgium, where is a very interesting church, there are a brass font and lectern of very good fifteenth-century work. There are casts of these in the South Kensington Museum.

The lecterns in brass are so common that I should not name them further, but that I wish to mention that in King's College Chapel in Cambridge, which is exceptionally fine, and that the candlesticks in brass, of great height, which Mr. Gilbert Scott designed, and Mr. Barkentin made within the last twenty years, are in perfect agreement with the style of the lectern, and are, I make bold to say, quite as fine as the old work in both design and execution.

In Germany the Lutherans spared much of the work in the churches which was destroyed in Holland and in England; and in St. Mary's, Lubeck, there is a brass sacrament house, on the north side of the high altar, of the most elaborate fifteenth-century work, with a spire,—the whole thing being about 25 ft. high, if I remember rightly.

The monumental brasses in some of the German churches of the fifteenth century are very fine. They are not simply engraved and filled in with black or colours, or with the ground left in strong hatching, but they are modelled in low relief, and are well chased and finished with a dull polish. Such brasses as these let into walls, not into floors, are, unless they are torn away in some revolution, more enduring than marble or stone, and are capable, either as cast and chased work, or as work hammered out of plate, of being made very handsome memorials. I have seen some of these lately in which brass, or brass and copper, have been used with marble as wall tablets with excellent effect.

I cannot plead for the use of brass very extensively in town churches, where there is smoke in the air, and often chemical vapours too, as the colour of the brass goes and it turns absolutely black, especially in cheap, common things, which are made of inferior brass; but in country places, and where the rubbing of the brass is not considered too troublesome, I would plead for its being used in the various ways I have described, as the more it is rubbed the better it looks, and the satiny polish of old, well-rubbed work is specially delightful.

In work connected with the household there is no need to say a word for brass. It is now used most extensively, almost too extensively, about fireplaces, in arrangements for lighting, whether by gas, electricity, or by candles or lamps,—in grilles, in dishes, in ornaments, and even in such things as flower-pots and jardinières, where the use of it becomes meaningless. It has almost come to this, that if you look into many windows where household articles are shown, you are repelled by the gaudy display of polished brass everywhere, and you are tempted by this extravagant over-use of what is a good and useful thing in moderation to forswear the use of it. It is the bane of everything in these days of "fashion" that a thing pretty and good in itself is seized upon after it has been introduced, and used for a time with reticence and good taste, and everybody must have this good thing everywhere until one becomes tired of seeing it, and almost wishes it were banished from use. I fear lest the use of brass should

* It should be mentioned here that the paper was not only illustrated by drawings, but by a large number of actual specimens of ancient and modern metal work.

be passing through this phase now, but it will always have its special use and beauty if care and good taste are exercised in the application of it.

Copper is a metal too soft to use very much in decoration, but it has a fine colour, and, used in mixture with brass (with which it has a natural affinity in colour, being the mother-metal, so to speak), it enriches the composition.

If the main structure of anything be in brass, and the copper be applied in inlay, in incrustation, in bands, or in many other ways, an admirable effect may be had. Mr. Benson has lately made lamps and many household things in which this mixture of metals is treated with great originality of design.

I have here an old tinned copper bowl of Persian work, which has good engraving upon it, and is of a good form. I do not know the use of this, but the ornament is quite characteristically Persian, and it is a good example of engraving where the ground is cut away and the pattern is left.

Steel was much used in the latter part of the eighteenth century, when the metal had newly come into general manufacture. It has rather a cold and severe tone, but in things which can be cleaned it may be used with excellent effect in a room.

I have here a fine example of the work of the end of the eighteenth century in an old grate, which is made of steel, engraved and enriched with bosses and beading of the refined kind which began to be used about that time. I find that our English work of this time was better than in any country in steel.

We now come to iron, the metal which is most used in decorative metal work.

Cast iron has not the same qualities of tenacity as wrought iron,—but there are many good qualities of this metal,—and for resisting fire in fireplaces good strong cast iron is the best. I have seen castings of iron called "rolls," for rolling steel, which, by careful selection of metals, and a special mode of melting, were so strong that a shaving has been turned in a lathe from one of these rolls (say 2 ft. diameter), which shaving was long and curling (say 1 ft. long) when measured in its spiral form, *not* straightened out, and it could be pulled out and would return to its shape, like a steel spring. This was, of course, quite an exceptional quality of cast iron, but it shows what that metal may be.

I can remember the time when wrought-iron ornamental work was not thought of; everything was made of cast iron, and very badly made too, as design, but that need not be so.

I have a small plate here of a design by Alexander Thomson (called "Greek Thomson"), of Glasgow, which shows what may be done in a railing in this material; and Mr. Butterfield has shown in the screen which closes the court of All Saints' Church, Margaret-street, how a master can treat this metal.

The quality of breadth of design can be got by cast work better than by wrought work (this applies to bronze as well as to cast iron), and in the screen I have mentioned, Mr. Butterfield has done what he could only have done in cast metal.

Mr. Philip Webb has treated cast iron in an original way too, covering it with fine delicate ornament, so arranged that it does not become monotonous, and yet is an enriching of the surface which cast work will specially allow.

The old backs of fireplaces which I have named before are good examples of the right use of cast iron. I have here the finest I have seen of its type, the back which I will call the Trophy back, from the trophies of arms upon it. This has what I believe to be the lion of Flanders on a shield, and dates itself by style as of the sixteenth century.

The back of the "Woman of Samaria" is interesting from the costume and architecture. Our Lord sits on one side of the well of Samaria with His disciples behind him, and the woman of Samaria stands on the other side listening to Him, with her friends and neighbours trooping out of the gate of the city. The well is of a fine early Renaissance type, with sculptured stone margin, and a canopy over it with tiled roof, into which the bucket rises. The brass water-pot is of fine design. The towers of Samaria are in the distance.

The Fairfax back is, of course, English, and I believe it is a Sussex back. It belongs to the time of the Commonwealth, and is of a shape commoner in England than abroad.

There are very fine backs of a later date in Sir Christopher Wren's part of Hampton Court Palace, and in the Hôtel de Cluny in Paris there are good French ones. The design of these, about the time of Francis I. and Henry II. of France, was particularly fine. They are larger and higher than the English backs usually were.

The cast-iron fire-dogs, which one may still find in Surrey, mostly broken, I fear, are very interesting. The dog I have here I take to be from an old French one, but I am not confident about this. It has a good, sturdy, cast-iron character, and succeeds in getting as much variety of shape and surface as can be expected in a material like this, while it is remembered that it must be exposed to many blows, and these often when the dog is heated and would therefore crack the more readily under a blow.

Wrought-iron, which has special qualities of strength, tenacity, durability, and relative cheapness, is coming more and more into use daily. For some time, as I have said, it fell out of use, but the Gothic movement in England brought wrought-iron into vogue again, and after the use of it being almost confined to ecclesiastical work in hinges and screens it has now come into houses. Outside railings, grilles to protect windows and fanlights, knockers, door-handles, internal grilles to cover pipes, dogs, fenders, and iron fittings for lights, are made in wrought-iron. There is some reason to fear in this, as in the case of brass, fashion may overdo a good thing, but the extravagant use of iron cannot be gaudy at least. Polished iron is not suitable for use in our damp climate, or I should recommend this, as the fine grey polish which it will take is very harmonious with rooms which are furnished richly. When labour can be found without too much inconvenience, polished iron should certainly be used.

For external work black or painted wrought-iron must be used. I fear that the manufacture of iron now is not favourable to such durability as some of the specimens I have here shown. The old mode of smelting with charcoal made a finer, closer, and more ductile iron, less liable to rust than the modern iron. Perhaps, also the atmosphere in our great cities and towns was not so unfavourable to the duration of wrought-iron work. In making fine wrought-iron work, it is important that the best iron now obtainable be used; indeed, when the work is intricate and needs many welds, none but good iron can produce the effects aimed at.

I have been favoured with drawings of ironwork from Italy and from England principally. The French have been very clever smiths always, and there is a little of their work shown in sketches from St. Maclou at Rouen. They have in this, as in nearly everything else of an artistic or ideal kind, carried their boldness to the extent of temerity. Their ironwork of Louis XIV.'s time is very stately, rich, and well balanced in design, with firm leading lines and graceful foliage and garlands. In Louis XV.'s time the curves became bolder and looser, as in all art of that time, and any one who has seen the Grande Place of Nancy, which was built in this reign, will not forget the wonderful profusion and richness of the iron screens which come in, I think, eight times in the regular composition of buildings and screens. In Louis XVI. time the work became elegant and rather stiff, and soon the fine ironwork died out. The German work is comparatively clumsy, and the endless scrolls with sprays going out at strange tangents, and passing through the scrolls in gratuitously difficult ways, the scrolls ending in flowers of the shape of silkworms cocoons, and with antennæ springing from them so as to remind one of great insects, which seem among the most characteristic Mediæval German work, are not very beautiful, if they are very clever from the iron-worker's point of view. In later times the ironwork throughout Europe seems to have been greatly affected by the French taste of the time. There are great quantities of fine rococo ironwork in Vienna, I believe, and I have seen in Zurich a house with extremely good balconies and balustrades in this style.

In England we have always had rather a different way of doing work to that of other countries, even when the same wave of feeling as to style passed over us. The very noble work of Huntington Shaw, from Hampton Court, which we have preserved in the South Kensington Museum, is different from any other work, though it has its points of resemblance with French ironwork. This and the gates and grilles in St. Paul's are some of our best ironwork in England. I have here some sketches from the Hampton Court screens, and I think this kind of work is very much to be studied and followed by us. The construction is good, and the ornament is so applied as to enrich the construction without hiding it, and to make a good composition of open and solid work, well contrasted and varied in the screens almost infinitely. There is a largeness of style in these screens and in the St. Paul's work, which must have been impressed on it by Sir Christopher Wren, who was such a great architect and engineer, and who impressed his feeling of grand style on all the people who worked for him. The later English work, of which I have a small example here (a bracket), and some interesting drawings, is simple and direct in style. One example from the Adelphi, which is now taken away, has a very good contrast of free and rigid lines, and I have noticed in the recent work of many of our architects that the best characteristics of the old examples have been followed.

I have here some good pieces of ironwork also. The churchyard cross comes (as far as I am concerned) from Basle, and was, doubtless, taken from some neighbouring churchyard. It seems to be a piece of work of the middle of last century, but the date has been partly obliterated. There is a small crucifix painted on the back of the box, of which some traces remain. The freedom and luxuriance of the ironwork go quite as far as such qualities may reasonably go, I think. The projecting hook is to hang either a lamp or a holy-water pot upon.

The grille is a fine piece of lattice work, and the finishing of the cross bars with roses on the frame is very pretty and simple. This has evidently been a door to an aumbry, and has had two locks, so that something precious was kept behind it.

The panel of scroll work is a good example of pure smith's work in getting ornament out of the flat bar, and then returning to the flat bar shape.

The "landier," as the French call it, is good as smith's work, and is an illustration of how meat could be roasted before a wood fire and small stew pans could be heated on braziers of charcoal in the small dishes on the swinging arms of the "landier."

The old English iron dog, of great simplicity of style, has a dish at the top for the same purpose, and is prepared with hooks for spits to rest on.

On the board are good examples of a knocker, a handle, some flowers, and some scrolls of rococo work, with very clever treatment of thin iron foliage.

The two Italian dogs of iron and brass have good points in regard to the treatment of both metals.

There is on the board a naïve and interesting piece of engraved work on polished iron sheet, with the openings cut out very irregularly with a chisel after the engraving has been done.

The lock and key of Louis XIV. style are very good.

The two high wrought-iron candlesticks and the gridiron are pieces of old work, showing how interesting a thing, made almost without design, may be made by the workman setting about in a simple direct way to his work.

There are many fine drawings here from Italian ironwork, including the screens at Orvieto, which have in the finials some of the best work in the naturalistic way that exists, I believe. There are also other screens, fire-irons, brackets, and well work, all of that surpassing beauty which Italian work had until recently, and which they have now quite lost, apparently.

In a paper like this I am only able to touch the fringe of so large a subject as the decorative use of metal work, but I have slightly described some uses of the metals most used in connexion with buildings. I have endeavoured to speak as much as possible only of what I have seen and known myself, and to illustrate my paper by actual examples.

It has been my great pleasure and privilege to witness much of the great revival in architecture, and I may say all of the revival in the arts as applied to architecture. I saw the Exhibition of 1851, and though I was too young to be able to understand the difference between our design and that of other countries,—and, let it be remembered, no country then exhibited very fine decorative work,—yet I know that at that time gasfittings made in imitation of

convolvulus; thin stamped brass leaves and opaque white glass flowers, out of which the gas-pipe came, were thought elegant; but that these things would now be scouted. I do not mean to say that I think the general level of taste is high, but it is better than it was then. In that Exhibition some work directed by Pugin was shown, and from that Exhibition we began to learn that the state of things in England as regards design might be improved. Many currents have run towards the improvement. Among these are the increased study of all kinds of old work by architects and craftsmen, the direction of work by Pugin, by Alfred Stevens, by Godfrey Sykes, and by numerous living architects and designers. The teaching of drawing, now so widely diffused, and, in consequence, the new spirit that is put into work by the men who execute it, are such things as I scarcely could have expected to see. Let it be always remembered that the same people, as to race, live in these islands as those who did some of the beautiful work which we have collected here, and of which we have drawings here. There is no reason why these men now living amongst us should not do work as good as the old men did. There is skill, and patience, and dexterity in our own people, and, as we need not be ashamed to compare English work, from the twelfth to the eighteenth century, with work of other countries, so, I am convinced, and that by experience, we need not be ashamed to compare that of the nineteenth century. The design, by whoever made, must be suitable to the material, and I will answer for it that there are people now who will carry it out, in metal work, in the spirit of the design. We may leave our record for future times in these accessories of architecture, as we shall in architecture, that there were good men now, who studied their work, took account of modern conditions and requirements, and, at the same time, studied how to treat the new things in the spirit of art, of loving study, and patient endeavour which characterised the work of former times.

[A report of the discussion which followed will be found on another page.]

MANCHESTER ARCHITECTURAL ASSOCIATION.

The ordinary fortnightly meeting was held at the Diocesan Building, on the 14th inst., Mr. L. Broth in the chair. The proposed new Charter of the Royal Institute of British Architects was the subject of discussion, in which Messrs. Mee, Chadwick, Mould, Hodgson, Woodhouse, and the Chairman took part. The following petition to the Queen's most excellent Majesty in Council was adopted:—

1. That the Royal Institute of British Architects has presented a petition to the Queen's most excellent Majesty in Council, praying for the grant of a new Charter of Incorporation, confirming the privileges which it enjoys under the charter granted to such Institute by his Majesty King William IV., subject to certain variations thereof which are sought to be made by the provisions of the said proposed new charter.

2. That the said provisions of the said proposed new Charter relate, among other matters, to the improvement of architectural education and to the establishment of examinations in connexion therewith, and further, to the adoption of by-laws, which are thereby authorised to be made, regulating, among other matters, the relations of the said Royal Institute to such branches thereof as may be established in the United Kingdom, or India, or any colony or dependency of the United Kingdom, and to other societies having kindred aims and purposes.

3. That your petitioners have perused the said proposed new Charter, and cordially approve of the provisions thereof.

4. That the said Royal Institute is the oldest and only chartered society in the United Kingdom, and includes among its members a larger number of representative architects, both metropolitan and provincial, than any other society.

5. That your petitioners, whose Association was founded in the year 1874, and who represent sixty-three persons engaged in the study and practice of architecture in the City of Manchester and surrounding towns, have at all times been in friendly intercourse with the Royal Institute, and have always recognised it as representing the interests of the profession generally.

6. That your petitioners take great interest in the subject of the federation of the said Royal Institute with provincial societies, and believe that by the closer connexion which would thereby be established between architects practising throughout the United Kingdom and the Colonies, great advantage would ultimately accrue to the profession at large, and to the public generally.

7. That your petitioners are satisfied that under the powers proposed to be conferred on the said Royal Institute due provision will be made by means of federation or otherwise for securing the advantages above referred to. Your petitioners, therefore, humbly pray that the new and revised Charter of Incorporation, for which the Royal Institute of British Architects have made application, as aforesaid, may be granted.*

ARCHITECTURAL SOCIETIES.

Manchester Society of Architects.—We understand that the Manchester Society of Architects have been empowered by the Fine Art Section of the Manchester Jubilee Exhibition to undertake the collection, selection, and hanging of such architectural drawings, &c., as will illustrate the progress of architecture in the United Kingdom during the reign of her Majesty, and that they are now taking steps in that direction.

Glasgow Architectural Association.—The third of the series of lectures was delivered on Tuesday night by Mr. James Sellars, I.A., at the rooms of the Association, West Campbell-street. The subject was "Quality, Pattern, and Price." The lecturer said that these three things were as important in connexion with a building as any other article of commerce. In order to obtain quality in a building, he was of opinion that the young architect must first acquire a thorough knowledge of construction, and then show that he possessed it by preparing a complete specification or description of the work to be done. The writing of specifications was almost a lost art in the present day, and the want of specifications led to all kinds of abuses. Quality in a building would generally be got if the tradesman understood that the architect knew how work should be done, and appreciated good work when he got it. As regards the pattern or design of a building, he urged that the chief thing to be aimed at was suitability for its purpose, both as regards arrangements and decoration, and condemned a blind following of precedent, the reproduction of old forms and arrangements of building, if it was done for no better reason than that they were copied from old examples. Engineers, he said, were not trammelled by precedent, and, as an illustration, referred to the Forth and Tay bridges, in which new forms, new materials, and every new invention were used. Dealing with price, he again referred to the necessity for careful specifications, in order to insure accurate estimates. With a specification there was nothing, in his opinion, to prevent absolute certainty as to the cost of a building. In conclusion, he urged the members of the Association to train themselves by every available means, so that their work would always be of the best quality, the most fitting pattern for its purpose, and produced at a fixed price. That would raise the status of the profession, and insure for it the respect of the public. The lecture, which was instructive and practical throughout, was listened to with attention by a large attendance of members and others interested. At its conclusion a vote of thanks was heartily given to Mr. Sellars.

Andover School of Art.—The annual meeting of this school was celebrated on December 14th, by a *soirée* and an exhibition of the works of the students. The Town Hall was handsomely decorated for the occasion by the Mayor, Alderman F. C. Ellen. The report was read by the secretary, Mr. Drinkwater Butt. This showed the number of students to be 81, a slight falling off from last year, which, however, was counterbalanced by the increased success in the examinations, in which there were only six failures.

* The report of this meeting was forwarded too late for insertion in our last.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The fourth meeting of this Institute for the present Session was held on Monday evening last, Mr. E. I'Anson, F.G.S. (President), in the chair.

Mr. J. Macvicar Anderson (Hon. Sec.) announced that the late President, Mr. Ewan Christian, had forwarded a copy of his report upon the Liverpool Cathedral competition, as a presentation to the Library.

Mr. Anderson further stated that the holder of the Godwin Bursary for the year, Mr. W. T. Oldreive, had submitted a report of thirty pages, dealing with a tour he had made in Germany, and which the Council had considered of sufficient merit to entitle him to the whole sum due, viz., 40*l*. The holder of the Aldwinckle Studentship, Mr. G. J. Oakeshott, had, in compliance with the conditions laid down, made a two months' tour in Italy, studying, measuring, and sketching examples of Classical Renaissance architecture at Florence, Siena, Bologna, Orvieto, Brescia, Mantua, Cremona, and Genoa. Mr. Oakeshott's drawings were on view in the Arbitration Room, and would well repay an inspection. The Institute had already voted its acknowledgments to Mr. Aldwinckle for this special one year's Studentship, and hoped that his example might be followed by others of its members. Another set of drawings was also on exhibition below, viz., those of Mr. A. B. Mitchell, the winner of the Soane Medallion. The conditions of this prize were that the successful competitor should go abroad for six months, and submit on his return the drawings he had made. Mr. Mitchell had been absent for twenty-seven weeks, and had submitted in all 215 drawings. He (Mr. Anderson) had seldom derived such peculiar pleasure from drawings he had inspected as he had from those of Mr. Mitchell. In point of execution and artistic touch they were really exquisite, the effect having been obtained by combining with pencil lines a shading in a delicate tone of Indian ink. The Council had, with the utmost pleasure, awarded the full sum of 50*l*. to Mr. Mitchell for work of such perfection.

Mr. W. H. White (Secretary) said that some injustice might be done if it was supposed that Mr. Mitchell had originated that mode of sketching. Mr. Mitchell, indeed, had informed him that he acquired it from a Russian student he had met at Milan, and in a late copy of the *St. Petersburg Architect* this student's drawings would be found reproduced.

Mr. R. Phené Spiers added that this Russian student, M. Tschagine, had studied for some years at Rome, and, doubtless, had picked up what was known as the style of the Fortuny school. Mr. Mitchell, having met with M. Tschagine, had doubtless adopted the same method, which was one well recognised in the French school.

Mr. R. W. Edis, F.S.A., said that having seen these drawings he would ask the permission of the Council to offer the sum of twenty guineas for one month's work on measured drawings and details of sixteenth, seventeenth, and eighteenth century English work, in opposition to mere sketches.

The President announced that on the 14th of February the Council would proceed to the nomination of candidates for the Royal Gold Medal. Members who desired to propose candidates should forward the names to the Secretary within the next fourteen days.

Mr. W. Brindley then proceeded to read a paper entitled "Marble: its Uses as suggested by the Past." Of this paper we give an abstract on another page.

In the discussion which followed,

Mr. Alfred Waterhouse, R.A., remarked that as he had been the means of inducing Mr. Brindley to read his paper, he would like to express the pleasure he had derived in listening to it, and to move a cordial vote of thanks to him. He would also congratulate Mr. Brindley on the beauty of his sketches of ancient quarries, which were of peculiar interest to the members of the Institute. Special attention had been called to the flatness of the mouldings in the ancient Roman buildings, and to the beautiful mouldings of black marble cut out of extremely thin slabs. In lining an apse with marble, architects should do precisely as Mr. Brindley had suggested, viz., use thin slabs of marble, and let them come together, as if each had a perfectly flat surface.

Mr. George Aitchison, A.R.A., seconded the

vote of thanks to Mr. Brindley, who had brought before them some of the rarest specimens of marble to be found in Europe. He had seen various specimens at Mr. Brindley's works, which he did not suppose could be seen elsewhere, except possibly in some of the Roman and Eastern churches. The information given in the paper had been so condensed that it was really difficult to enlarge on all the subjects. Many of the specimens were quite new to him, and he might particularise a beautiful bit of green marble from Norway, exhibited by Mr. Brindley at the Health Exhibition. The instances which had been given in the paper of the way in which the Greeks, Romans, and Byzantines had used marble, were extremely useful to English architects who had that material to deal with. Unfortunately, at the present day it did not find much favour with the public, on account of its cost possibly; but its use was one of the most effective and permanent means of imparting colour to the interiors of buildings. He could not quite agree with Mr. Brindley as to the use of it externally, and particularly in London, where it so rapidly got corroded on the surface; and so covered with the usual coating of London soot and dust that many of the finest marbles might be mistaken for any common kind of stone. The columns at the Grosvenor Gallery, which, he was told were of Oriental jasper, after being unpolished for a few years, were hardly to be distinguished from Portland stone, except on a wet day. He had seen the grand collection of antique marbles Signor Corsi sold to the Duke of Devonshire, which were given to the Radcliffe Library, and afterwards turned over to the museum at Oxford. At Mr. Brindley's suggestion, he went down there, and by the courtesy of Sir Henry Acland the cases were brought into the light, when he had the pleasure of inspecting them for the greater part of a summer's day. One specimen was particularly interesting; he did not know its modern name, but by the ancients it was termed phengites. It was a yellow and white marble, which took a brilliant polish, and Domitian was stated to have had the corridors of his palace lined with it, because, acting as it did as a mirror, he was not afraid of being stabbed from behind.

Mr. Burke said that Mr. Brindley had taken them over a great extent of ground. He had said that in the old mosaics he had found the tesseræ deep, and that was really the case, but the reason why these were not used at present was that people would not pay the money for them. In all the best types of old mosaic he had seen, the pieces were small but deep, three-eighths of an inch being about the size used, but when mosaic was revived twenty or thirty years ago, multiples of half an inch were made. Of the three-eighth-inch there were some 5,200 tesseræ to the square yard, and in the half-inch about 9,400. It followed that the cost per yard, in a given area, must be ruled by the multiplicity of the tesseræ laid down, and that was why all work at the present day was inferior to that spoken of by Mr. Brindley. It had been said that in this climate marble was corroded by the action of the weather, and no doubt that was so. It was also the case in France, but the great fault in England was that it was not kept clean. The same thing occurred with stone and many other materials, but it would be avoided if the buildings were kept cleaned periodically, and marble and various materials might then be employed on the outside of buildings, looking for a number of years almost as well as when first put up. Some columns could be seen in a building in Cockspur-street* not at all corroded, and, except that they were very dirty, they appeared to be as good as when new, so far as the surface was concerned. The angles were still sharp, and he had not been able to discover that any particle of the surface of the marble had been affected. If a company could only be established which would take in hand the cleaning of public buildings, then marble might be used with both a present and lasting effect.

Mr. William Woodward remarked that after what they had read in the *Times*, after what Mr. Brindley had said that evening, and after seeing the specimens of marble in the room, he hoped they would hear no more of the ridiculous theory as to the intentional waving of the pavement of St. Mark's.

Mr. J. H. Heathman spoke as to the advisability and practicability of keeping buildings clean, and gave some of his experience in connexion with such work.

Mr. Thomas Blashill desired to express a hope that so beautiful a collection of specimens might remain for some few days open to the inspection of the members. He had had the pleasure of looking at many of the marbles in Rome and in the neighbourhood of Naples, in company with Mr. Brindley, and he hoped the members would not lose such an opportunity as they now had of making themselves better acquainted with so beautiful a material, with a view to using it as occasion enabled them to do so. He had been much struck with the reluctance the English people appeared to have to the use of marble. In travelling on the Continent, from Rome to Holland, he had found in all the countries he had passed through that marble was profusely used, both in and out of doors. Why there was a deadness in England to the beauty of marble he had never been able quite to find out. Perhaps it was because the English people had not seen sufficient of it; and when the demand for marble arose, he hoped it would be got cheaper and more easily.

Mr. J. P. Seddon said that as far as his knowledge of marble-work went, great damage had been done in the endeavour to clean it. It had been mainly used in England in interiors, where it was too often simply cleaned out of existence by zealous people with pails of water and soap. Twenty years ago the whole of the steps up to the altar of a cathedral he knew were of black marble, but now they were like the poorest of limestone, a great portion of the surface being absolutely washed away. Those who put in marble should give careful instruction that it should never be washed in that way, but rather polished. There were many valuable marbles to be found in this country, and he had never observed any reluctance to their being used; indeed, people seemed to be very pleased to have them. The Devonshire marbles were used with good effect, because of their warmth of tone.

Mr. R. Phené Spiers remarked that he would not like it to go forth as the opinion of the Institute that the mere washing of London buildings would preserve the stone. Quite the contrary was the case.

Mr. Ralph Nevill said that in countries where the summers were hot the coolness of marble was very grateful, whereas nothing could be more unpleasant in an English home than any great extent of marble surface. He remembered going into the beautiful room at Gatton Hall, built by Lord Monson as a reproduction of the Corsi Chapel at Rome, and it was like entering a tomb. The coldness of marble always militated against its general use in England; but where it was most likely to be of service was where great cleanliness was required, as in many public buildings, and where good systems of artificial heating could be applied.

Mr. Edis said that he entirely differed with Mr. Nevill as to the effect of the use of marble in English houses. He had used it considerably, and had never found any unpleasant effect, nor fault found, with interior decorations of marble. By the aid of those marble masons who had joined with him in this decoration, he had been able to do the work almost as cheaply as in tiles delivered in London, though, no doubt, that was to a certain extent due not so much to their cost as to the carriage and fixing of them. He knew of two large country houses where the halls were more or less done in marble, very warm, charming, and bright in effect. At the same time there was very much difference in the marble decoration of interiors. If a vast amount of colour were attempted in marbles the effect was kaleidoscopic. Mr. Brindley had in his paper thrown out hints which were extremely useful to architects and students. It would be well if the Institute applied to quarry owners for 4-in. cube samples of all stones and marbles produced throughout the kingdom, and he hoped the hint would be taken up by the Council in order that such a collection might be formed.

Mr. Octavius Hansard said that for years the Institute had possessed one of the most remarkable collections of stone ever made in this country. It was contained in a cabinet on the landing of the staircase leading up to the meeting-room, and represented the selection of stones for the Houses of Parliament. But he supposed the case was not opened above once in three years, its position being an unfortunate one.

Mr. Edmund Woodthorpe considered that what the last speaker had said was another powerful reason why the Institute should remove from their present wretched building. They had within their walls beautiful specimens locked up in a cupboard located near the lavatory, while the collection of portraits was hung up so close to the ceiling that one could not see the features of their past presidents. There was the greatest necessity for a new building.

The President said that he very much agreed with Mr. Edis as to Mr. Nevill's observations respecting the non-applicability of marble in our domestic architecture. It occurred to him that it was a matter of taste, and his taste went with Mr. Edis,—in fact, he considered that marble might be satisfactorily applied in the internal decoration of English houses. The wonderful industry of the lecturer, not only in compiling his paper, but in bringing so valuable a collection of marbles together, entitled him to their warmest thanks, and he (the President) agreed with Mr. Blashill that it would be a pity if within a few minutes after the meeting they should all be cleared away. He understood now that Mr. Brindley would permit the specimens to remain until the following Thursday, which would allow better opportunities for inspection. One thing that had struck him in the numerous visits he had, for the last few years, paid to Rome, was the enormous amount of marble the Romans had imported. Scarcely any people had been so great in their building-work, and the wealth of marble which had been massed together in Rome surpassed the wealth of any other building material for decorative purposes that had ever been known. Even now, in passing along the Via Sacra, one saw in all directions fragments of marble columns and bases, doubtless at one time forming portions of magnificent buildings. And not only were these to be seen in Rome, but they were scattered far and wide over the Roman Empire, at least as far north as Lyons and Perigueux, and as far south as Sicily. The Baths of Caracalla also showed the enormous amount of surface covered, the Romans laying on the marble as a thin veneer, not more than ¼ in. thick. Some reference had been made to the prodigal use of marble in Belgium, but it must be borne in mind that it was a marble-producing country. A great quantity of the marble used in this country some time ago came from Namur, and the Belgians had sent over an enormous amount of manufactured chimneypieces.

The vote of thanks was then put, and carried by acclamation.

Mr. Aitchison said that before Mr. Brindley replied they should not lose the opportunity of asking the owners of marble quarries to supply the Institute with specimens of their products, so as to form a collection which would be useful and instructive to the members and the public. He might add to what the President had said about Rome, that there were two or three miles of quays on which the marble was wont to be landed, and where the unworked blocks were still lying, some on the pavements, and some slightly beneath the soil, so that when a demand arose for antique marble, there would be a fine supply to hand.

Mr. Brindley, in replying, referred to the President's remarks as to the extent of the Roman quarrying. He had prepared a rough diagram, showing the extent of the Roman quarries, and it would be seen by it that they were scattered over the entire Roman empire both in Europe and Africa. It had been said that Roman marbles had been found in Lyons, and in the cathedral there could be seen two columns, of about the tenth or twelfth century, of Numidian marble, such as was not even to be found in Rome. This would show the difficulty he had had in compiling his paper, for in France alone there were 626 quarries, while Belgium had no fewer than 100, the whole of the district about Namur, extending into the North of France, being one mass of marble, chiefly grey and reddy-brown. Some one had mentioned Lord Monson's hall as an unsatisfactory example of the use of marble; but Mr. Holford's house in Park-lane was one of the best examples of marble-work in London, although there were far too many colours. Mr. Seddon had referred to marble-cleaning, and he might say that a year or so ago, in passing through Leicester-square, he had seen a man cleaning down the statue of Shakspeare, each stroke of the brush

* The Sun Fire Office.

making the dirty marble immediately white. The man was simply using muriatic acid, which ate away the face of the marble. With reference to polygonal slabs, architects never thought of covering an apse with ground-out slabs, but he had had to do it on several occasions. The columns referred to by Mr. Aitchison, in front of the Grosvenor Gallery, were *lumachella*, composed of compressed shells, with an amount of cement in them. It was akin to our Petworth and Purbeck marbles, which were simply compressed muds.

The President stated that the next meeting would be a special one, held on the 17th of January, to award the medals and other prizes.

THE ARCHITECTURAL ASSOCIATION.

THE fifth meeting of this Association for the present Session was held at 9, Conduit-street, on the 17th inst., Mr. J. A. Gotch (President) in the chair.

The following new members were elected, viz., Messrs. R. A. J. Bidwell, J. Linton, C. D. Rutter, H. E. Napier, W. Goodwin, R. G. Borland, G. Horsley, F. L. J. Barrow, E. Banks, G. W. Soltau, E. A. Cooke, Percy M. Roberts, E. A. Benstead, A. G. Turner, F. A. Kirby, Percy Clark, H. Harris, and F. V. Stokes.

Mr. H. D. Appleton (hon. secretary) announced the receipt of the following communication :—

"Société Centrale d'Architecture de Belgique,
Fondée en 1872.
Bruxelles, 8 Décembre, 1886.
Secrétariat, 46, Boulevard Anspach.

Monsieur le Président,—Nous avons eu le plaiser de communiquer, à notre Société, dans la dernière Assemblée Générale, votre estimée du mois de Novembre dernier.

Le titre de Société Correspondante que vous nous offrez nous honore beaucoup; notre assemblée a conféré également et à l'unanimité le même titre à votre société.

Nous sonhaitons volontiers avec vous, Monsieur le Président, que la correspondence qui s'établira entre nous développe les sentiments d'affectueuse sympathie, et de bonne confraternité entre les membres des deux sociétés.

Nous vous prions d'agréer, Monsieur le Président, l'expression de nos sentiments les plus distingués.

Le Président, JULES BRUNFAUT.

À Messieurs les Président et Membres de l'Association Architecturale de Londres."

A donation to the library was announced from Mr. F. R. Farrow (Assistant Librarian), consisting of two volumes on "The Antiquities of Ionia." A cordial vote of thanks was thereupon presented to Mr. Farrow.

Mr. H. Longden then read a paper on "Decorative Metal Work," which we print on another page.

The Chairman, in inviting discussion, expressed regret that Mr. Longden's excellent paper had not extended to greater length, he being so well qualified from personal experience to treat such a subject as that of Decorative Metal Work. The numerous examples Mr. Longden had brought with him were really as instructive as his paper, showing as they did the manner in which the various metals should be treated, and that effect could only be gained by treating each metal in its own natural style. This principle was becoming more and more recognised in the present day. The kind of *tour de force* which was the aim of the artist of fifty years ago,—if artist he could be called,—to imitate in one material what was wholly foreign to it, seemed to be dying out, and people were getting more into the way of treating materials naturally. Mr. Longden had brought some excellent examples of work in each of the metals he had named. His suggestion with regard to the ornament for the fire-stove was good, and might with advantage be adopted by some enterprising firm. In iron, and more especially cast-iron work, there were many excellent examples extant, dating from the end of last century, one which he had in his recollection being a very large stove at Knole House, of which the casting was extremely delicate. The great drawback to cast iron from an artistic point of view was that if one had a good design, one's neighbours might have a similar thing, so that miles of the same pattern in cast iron might be seen. Cast-iron fire-dogs were seldom to be seen in use now-a-days, but he had noticed them used at a country house in Northamptonshire. At Drayton, in the same county, there was so much iron work that the owners lately found it would take about 800*l.* merely to repair it. In a little inn at Lisieux, in Normandy, he had seen the spit and the two dogs turned by a weight before the open fire. In connexion with cookery, all things difficult to clean should be avoided. Art was in reality only common-sense made beautiful, so that to devise a gridiron which was beautiful to the view, but which would be an everlasting nuisance to the cook, would not be a realisation of art. An enormous quantity of beautiful ironwork was to be seen round about London, and he had more particularly in view some fine gates near Carshalton. These had never been figured, but were well worthy the attention of the Association.

A Member remarked that Pugin might really be termed the progenitor of brass bedsteads, one designed by him being still preserved in his house.

Mr. J. D. Sedding said that Mr. Krall, who was a true artist, was sitting beside him, and might have something of interest to say. In looking at the examples before them, and especially at the Swiss churchyard cross, they could realise how extremely difficult it was to draw ironwork. He liked to frequent the workshop where it was being wrought, and hoped that many of the members would do the same. The practical character of the papers that were now being read before the Architectural Association redounded very much to the credit of the President. Mr. Sedding then proposed a vote of thanks to Mr. Longden for the care he had bestowed upon his paper, and the number of subjects he had brought to illustrate it.

Mr. Krall said that the only thing that Mr. Longden appeared to have omitted from his interesting paper was the treatment with ironwork of panels in doors and in the dadoes and friezes of rooms, as in the olden time, which had been adopted, perhaps, more thoroughly in France than anywhere else. These panels were very effective when properly treated.

Mr. L. A. Shuffrey asked whether the models for casting the old fire-backs were originally made in wood? They must have been modelled in some way, and he had often wondered whether they were done in clay, or wax, or otherwise. At Penshurst Place there were some fire-dogs with the arms of Lord de Lisle.

Mr. G. H. Fellowes-Prynne seconded the vote of thanks, and said that the colour of ironwork was in fact one of the most difficult things that architects had to deal with. In its natural state it was always beautiful, but in the grey distance its effect was frequently lost, and therefore required picking out in colours. Chocolate and blue had been used to a great extent, but the latter colour again seemed to throw it into distance. It was a question also whether gilding ironwork to imitate brass or any other metal was the right thing to do.

Mr. J. M. MacLaren said that Mr. Longden's paper had chiefly dealt with old work, but he would like to hear some discussion on the subject of modern ironwork, and a comparison drawn between the two. One of the things which was often very unsuitable in the design of modern wrought-iron work was the spacing-out. The arrangement of the curving and the filling of the detail in the best examples was generally done on a great scale. In looking at the treatment of modern ironwork, and especially the wrought-iron work of the last twenty years, it seemed to be of one quality, and very unsuitable, with a smallness of scale in design. The designer appeared, first of all, to start with a want of principle, and then to go on in a very languid sort of way, in filling up the spaces; in fact, starting at random from one corner and eventually landing at the last corner, somehow or other. Thus a great deal of modern ironwork was designed without any principle guiding the designer, which often led to smallness of scale, —a pettifogging kind of treatment, with an unsatisfactory result. One of the most beautiful examples of modern ironwork had this great defect of smallness of scale; he referred to the sign hanging out from Mr. Norman Shaw's building at the corner of Pall Mall and St. James's-street.* On paper its design looked skilful and well set out, but the reality had the fault of being too small in scale: consequently a great deal of the value of the curves was lost as the sign hung against the sky. Had the height at which this sign would hang, however, been considered, and less detail put in, it would have been far more successful. There was one other point that architects had to face, viz., the treatment of cast-iron work. He was glad that Mr. Longden had not shirked the matter, and one of the first things architects would have to do, with regard to the treatment of cast-iron work, would be to study its capabilities and its limits, and thus be enabled to brush away a great many of the difficulties that beset them in designing in cast iron. In the treatment of cast-iron work the great thing to aim at should be reserve, instead of redundancy of design. Eastern work generally was very suggestive in the treatment of cast-iron, but a great deal in this direction remained to be done in London, for one might travel through its miles of streets without coming across a single lamp-post worth looking at. This was not as it should be, and he would like to see subjects put down in the Examination for cast-iron work. He believed that Mr. Aitchison was somewhat unpopular with the Royal Academy students because he had put down several such things amongst his subjects, the reason for his unpopularity being that the students found themselves face to face with rather difficult tasks. When a student sat down to design a column well, it took some time to study the general proportion and the spacing, and indeed was one of the most difficult tasks he could be set to do. It was, in fact, somewhat like designing a wall-paper, where there was a subject with certain limits which could not be overstepped, for in dealing with cast-iron there were the same limits. A great deal might be learned by architects both in regard to proportion and detail in the designing of cast-iron work.

Mr. H. W. Pratt remarked that the last speaker had called to his mind a criticism he had heard from a gentleman who was neither an architect nor an artist, although he had some appreciation of what was good proportion and what was not. This gentleman one day called his attention to the design of the gates under the great tower of the Law Courts, stating that there seemed to be a lack of scale in them as compared with the building to which they were attached. He (the speaker) at once felt the truth of the remark, although he spoke with great diffidence in criticising the work of so great a master in decorative ironwork as Mr. Street was. The excellent work in the grilles and front railings there was so good that the gates did not show equally to advantage. In the designing of wrought-iron work there seemed too often to be a multiplicity of detail, and a lack of bringing out the most prominent features; and in looking at the old examples before them one felt this all the more. It was characteristic of the old work that it was designed for the purpose for which it was to be used, and there was an amount of "go" and an interest about it which the modern work entirely lacked. Mr. MacLaren had referred to the inartistic London lampposts, and that reminded him that he had lately found an old Sussex town lighted by bracket-lamps from the houses, which struck him as much more interesting and picturesque than the usual ugly lampposts. The members were under special obligation to Mr. Longden for bringing so many valuable examples of metal-work before them, but he (Mr. Pratt) should have liked to have heard some suggestions as to how modern wrought-iron work could be treated so as to preserve it better. The old examples before them, and the many old railings and gates about the metropolis, showed that ironwork could last for a great number of years, though the modern work did not last so well, but soon began to show signs of rust and giving way. It seemed a pity, considering the amount of pains thrown into the scrolls of leaf-work and foliage, that so much labour should be put into something which should so soon decay. No wonder, therefore, that people had recourse to cast-iron, and that, too often, of a very inferior design. It was only repeating an old tale to refer to the designs in cast-iron being an imitation of wrought-iron work, but it always astonished him that founders who knew how the designs were produced should continue to practise seventeenth or eighteenth century wrought-iron designs in cast-iron work, which were not at all adapted to the material.

Mr. Max Clarke referred to the excellent designs in cast-iron work of Mr. Sellars and Mr. Thomson, of Glasgow. He would have liked to have heard something about the railings which had been put round the new statue of Queen Anne, in front of St. Paul's Cathedral. He understood this was a reproduction of the first cast-iron work put up in England, exactly reproduced by Mr. Penrose. He would have liked to have had some information as to Wren's cast-iron work.

Mr. Leonard Stokes said that cast-iron work had been a good deal "slanged." In wrought-iron work they should be careful lest in ten

* Illustrated in the *Builder* for Nov. 14, 1885, p. 699.

years time they asked themselves how they could have gone in for all this twisted work of all shapes and forms. Architects to a certain extent had themselves to blame for what appeared in the founders' catalogues. If they would only set the example of insisting upon having what they wanted, then the great founders would produce something fit to be used. At present, in his opinion, the opposite was the case. He would like to have Mr. Longden's opinion as to whether bronze, in itself a costly metal, could be legitimately gilded.

Mr. A. O. Collard thought that a reasonable complaint had been made about the London lampposts, but any one who walked along the Thames Embankment could not fail to notice the peculiarly excellent lampposts designed by the late Mr. Vulliamy. Mr. Longden had omitted to refer to the many grand old hinges on church-doors. These not only acted as hinges, but actually bound the doors together, enabling them almost to dispense with tenons. Then, again, he might mention the very fine specimens of candelabra and lamps to be seen in this country as well as abroad, one candelabrum in a curious little church near Minster, in the Isle of Thanet, holding no fewer than thirty or forty candles.

The vote of thanks was then put, and very cordially received.

Mr. Longden replied, and observed that the study of this kind of work was at once his business and pleasure. He had been collecting for some time things which seemed to illustrate excellent work in the different metals; some of these he had brought with him, mostly from his own collection, but others had been lent him by Mr. Peto, the architect. He was afraid he had somewhat cursorily dealt with the subject, but he had been afraid to say too much and to be too technical. He had originally been trained as a founder, and therefore might naturally be expected to take notice of the remarks that had been made about cast iron. He was glad to hear Mr. Stokes say what he did. Twenty years ago he (the speaker) asked an architect to design a particular thing in cast iron; but the answer he received was, "You might as well ask me to design in melted butter!" That architect was apt to say rather sharp things; but if he had reflected he would never have made that remark, because it was a legitimate material, and it was his own fault if he could not design in it. Mr. Sellars, of Glasgow was an admirable designer, a man of the greatest fertility of mind and appreciation of the various materials, and he had designed very fine cast and wrought iron work, as had Mr. Thomson. As a founder, he (Mr. Longden) would say that cast iron could be decorated so as to be exceedingly beautiful. The stove at Knole, referred to by Mr. Gotch, was a monumental erection, as the French say, but was covered with delicate work, and did not look heavy. Cast iron, he affirmed, could be treated well, and if people did not do this, it was their own fault, and not that of the material. The colouring of wrought iron was no doubt a difficult matter. He remembered a bit of work at Rouen, part of which was coloured darkish, and the remainder gilded, and another example in the Cathedral at Perugia was coloured pea-green, and gilded in parts. The chocolate and blue of the "Mediæval metal-worker" were not at all to be admired. The Italians made their work exceedingly thin, and in some cases even as thin as tape. When gilded iron did not imitate anything else, it was quite legitimate; because gilding was quite a different thing from brass, and could not be mistaken for it. Dealing with the duration of ironwork, he was sorry to say that there was a great difference between the quality of the old and modern material. The Swiss churchyard cross he had referred to was an example which had been out of doors at least a hundred years, without an atom of its surface being gone, and it showed what sort of material used to be produced. The best recipe he could give for getting ironwork to last was that everybody who had it made should insist on having the very best material, and that it should be well painted. He had not said much about *repoussé* work, but in some cases the effect was got with great simplicity, and the warming-pan he had exhibited was an excellent specimen of this. *Repoussé* work had been very well done in England in recent years, and not long ago when comparing work he had seen in France, Germany, and Switzerland, with English work, he found that the latter was as good as anything they were doing abroad. With regard to gilding bronze, he had been asked why so beautiful a metal should be gilded? The reason was, that bronze might be finely worked, being susceptible of the most delicate chasing, which in some positions would not be well seen unless it was gilded. He had not dealt with candelabra. There were several fine ones in England, commonly called "spiders," but some of the best he had seen were to be found in Holland, and notably in a church at Leyden. These were often well treated, and the appearance of the great arms for candles was very effective in perspective. There was also a fine example in the Church of St. Marie at Lubeck, and any one who wished to see good Renaissance iron work of a northern type should visit that city. As to the patterns for fire-backs, he had never seen any old ones, and he was not aware how they were done. He imagined, however, they were frequently done by modelling in plaster or wax on the board, and the mould taken from that. These things were only made once, and so it did not matter if the wax or plaster came away, but now-a-days patterns were kept and reproduced. Mr. MacLaren's remarks as to scale and design were good, but were more matters for the consideration of architects. There was no doubt that much modern ironwork was very often "all-overish."

CRYSTAL PALACE SCHOOL OF PRACTICAL ENGINEERING.

The fourteenth year and the forty-second term of this School closed on Saturday last by the usual gathering of the friends of the school, exhibition of their work, delivery of the report of the examiners, and presentation of the certificates awarded to the students. The examiners on this occasion were Messrs. Fred. H. Anson, C.E., M.E., and S. C. Best, C.E. Mr. John Carruthers, C.E., Consulting Engineer to the New Zealand Government and to the Republic of Venezuela, presided, and expressed the pleasure and surprise he had experienced in his going over the School and examining the work of the students, who enjoyed there advantages unknown when he entered upon the profession. The combination of theory and practice in this school were admirable and most effective.

The lectures for the term were on "Materials and their Manufacture." Twenty-five students attended the lectures; twenty-two were eligible for examination; eighteen passed the examination satisfactorily. W. E. Underwood was first, and had also a certificate for work in the fitting-shop; B. G. Lloyd was second for lecture questions, and a certificate as first for work in the fitting-shop. For work in the drawing office, H. P. Miles was first of ten students in the order of merit; in the pattern-shop, J. H. Chute was first of eight students awarded certificates.

In the second year's course, fourteen students of the first term received certificates for the preparation of surveys, plans, &c., for Parliament; F. Grover first. Thirteen students of the second term received certificates for calculations, plans, and estimates for a railway and dock; R. P. Verrall first. Six students of the third term received certificates for design and construction of existing or original engineering or other works; J. F. Harrison first. Special certificates were awarded to two students for a fourth term in the civil engineering division, devoted to sanitary engineering, including water supply. Another special certificate was awarded to J. Chiles in the marine-engineering section. This certificate is awarded for successfully driving engines at sea over a course of 1,000 miles. Three certificates were also awarded to students in the Colonial section.

Mr. J. W. Wilson, Principal of the School, called upon as usual, delivered a brief address, mentioning that the School commenced with the year 1873, when nine students were enrolled. The number had increased continuously, until the complement of eighty has been reached, which has been the number for the last and several preceding terms. About 150 of our most eminent engineers and public men have attended and given their services in examining and reporting on the students' work, and in presiding at the close of the terms. From all of these gentlemen gratifying expressions of opinion respecting the character and work of the school had been recorded.

BROAD FILTRATION DRAINAGE AT GODALMING.

An inquiry was held at Godalming by Mr. Arnold Taylor, Inspector of the Local Government Board, on Wednesday week, in reference to an application from the Godalming Main Sewerage Board for sanction to borrow 8,000*l.* for the purchase of land to be used for the purpose of sewage purification for the borough and contributory districts. Mr. J. C. Ramsden, chairman of the Sewerage Board, stated that in July, 1885, the Board made an application to the Local Government Board to sanction a loan to carry out a system of sewage disposal by chemical treatment and precipitation, but after that inquiry the central Board refused to sanction the loan, because it did not altogether approve of the scheme. The Local Government Board at the same time advised that, as a system of chemical treatment exclusively would not be satisfactory, a system of broad irrigation or filtration through land should be adopted. The Central Board asserted that a system of chemical treatment only would involve the Godalming Board in trouble with the Thames water companies, as the Wey, which passed through the district, was a tributary of the Thames. There was no alternative but for the Sewerage Board to secure a suitable piece of land in the district for the purposes of broad filtration. After various endeavours, they obtained an offer from the Smith Charity of 83 acres (the Unstead Farm) for 7,500*l.*, subject to the consent of the approval of the Charity Commissioners. The Surveyor, Mr. Moon, reported favourably as to the suitability both as to the locality and character of the land for sewage irrigation purposes. The population of the district to be drained was reported to be:—Borough of Godalming, 2,505; Farncombe, 2,500; Charterhouse, 1,200; Crown Pits, 560,—total, 6,705. The estimated population forty years after this, taking into account the land adopted for building purposes, was given at 11,163. The rateable value of the united district is 27,000*l.* The area of the several contributory places proposed to be sewered is 967 acres; the length of the sewer from the town to the works would be about 2,765 yards. Mr. Eastwood, an owner, objected to the proposed site, as it would injure his property; and the Inspector expressed the opinion that, having so much land as was proposed to acquire in this instance, he did not think there would be any nuisance if the works were properly managed. Alderman Stedman raised the question as to whether, if the land were put up to public auction, the Board would not require to give more for it, and the Inspector replied that such a contingency was unlikely, as the land was at present of more value for public purposes than any other, and the Board were, perhaps, giving more for it than anybody else would. A question was also raised as to allowing the refuse water from the mills at Catteshill, of Messrs. Spicer and Co., to flow into the new system, the Clerk mentioning that the authorities had power to reject everything but sewage, but that matter would hereafter be considered. The Inspector will hand in his report in due course. The Local Government Board has intimated that it will comply with the request of the Rural Sanitary Authority and hold an inquiry on an early date in reference to the alleged pollution of the River Wey from various sources.

LIVERPOOL CATHEDRAL DESIGNS.

Sir,—With reference to two points in your article on my report in your paper of Saturday last [p. 867], I would say:—1. That as regards the estimate, the sum within which the competitors were to work was 500,000*l.*, and not 300,000*l.* The latter sum was named by the committee, but owing to my representation as to its insufficiency the larger sum was allowed, and on it my valuation has in each case been based. I stated from the first that less than 500,000*l.* would be insufficient for the erection of a cathedral worthy of the city. 2. Although I was undoubtedly surprised at the manner in which it was done, I had no objection whatever to the publication of my report. I believe I never have, and hope I never shall, write anything of that nature which may not be published. I write what I honestly think, and if people are not satisfied I cannot help it. I have done what I believe to be my duty.

As regards Sir Christopher Wren's plan for

St. Paul's I perfectly well remember the story, though it must be fully fifty years since I read it as related by Elmes; but when looking again over the plan two years ago I came to a very definite conclusion that it was good for us, and for his fame, that it was not carried out, and was disappointed accordingly.

EWAN CHRISTIAN.

Hampstead, December 20, 1886.

CHIMNEY SHAFT FOR "DESTRUCTOR."

SIR,—The following description of shafts for "destructor furnaces" may be of use to your correspondent [p. 893, *ante*].

Messrs. Manlove, Alliott, Fryer, & Co., of Nottingham, who have had experience in this class of work, have designed a chimney-shaft, which they recommend, the dimensions of which are as follow:—

	ft.	in.
Height from ground line to top of coping	150	0
Outside diameter at bottom over flue opening	14	6
Inside diameter of main shaft over flue opening	8	6
Outside diameter at top under brick set-offs below cap	8	9
Inside diameter at top under brick set-offs below cap	8	0
Inside diameter of fire-brick lining=to inside at top	6	0

The shaft from the ground-line to the top is divided into six sections:—

	ft.	in.
1st section to a height of 30 ft. above ground	3	0 thick.
2nd ,, of 24 ft. high	2	7½ ,,
3rd ,, of 24 ft. ,,	2	3 ,,
4th ,, of 24 ft. ,,	1	10½ ,,
5th ,, of 24 ft. ,,	1	6 ,,
6th ,, to underneath cap	1	2 ,,

Fire-brick lining 4½ in. thick for 30 ft. high above ground, with an annular space all round, between itself and the shaft proper.

Foundation bed of concrete, to suit locality or nature of ground.

Bradford Corporation Chimney.

Circular brick shaft in connexion with "Fryer's Destructor" for town refuse:—

	ft.	in.
Total height, including foundations	192	0
Height from ground-line to top	180	0
Concrete foundation, square	30	0
Outside diameter at ground surface	14	1
Inside diameter at ground surface	9	7
Outside diameter at top	9	0
Inside diameter at top	6	8

The shaft is built up in four sections, the lowest being 2 ft. 9 in. in thickness, and the highest 1 ft. 2 in.

A fire-brick lining, 8 ft. internal diameter, is built to a height of 45 ft., apart from the shaft proper.

The foundation rests upon tough clay of a somewhat bluish colour, known locally as "Bowling Tough."

The time occupied in building was nearly five months. The batter of shaft is ½ in. to 1 yard, or 1 in 72.

Mr. J. H. Cox, Borough Surveyor, designed the shaft, and Messrs. Naylor & Smith were the builders.

Chimney Shaft, Lett's Wharf, Lambeth (City Sewers Department).

For destructor apparatus burning 70 to 80 tons of refuse per diem.

This shaft is founded on a cast-iron cylinder filled with concrete, on account of the ground being affected by tides.

	ft.	in.
Height from ground surface to top of Portland stone cap	150	0
Outside measurement at foundation	18	0
Outside measurement at ground-line	14	6
Outside measurement at top	8	4
Inside measurement at top	6	0
Height of 4½ in. fire-brick lining	30	0

The shaft is built with London stock bricks, and was completed in three months.

Colonel Haywood was the engineer, and Messrs. Manlove, Alliott, Fryer, & Co., the builders.

R. M. BANCROFT.

Sewage Disposal at Royton. — The *Oldham Standard* reports that the Royton Local Board, having received notice from the Corporation of Salford as to the intention of the Corporation to take proceedings against all local authorities who allow sewage matter to flow into the rivers Irk and Irwell, or any of their tributaries, at a special meeting held on the 10th inst., unanimously appointed Mr. Robert Vawser, C.E., of Manchester, engineer to the Board, for the purpose of preparing plans, sections, and estimates for the construction of the works required for effectually draining the district and dealing with the sewage at outfall works, and also for the supervision of such works during their construction.

The Student's Column.

STONE QUARRIES.—XXVI.

SLATES.

WE propose to devote the concluding article of this series to the consideration of slate quarries. After what has already been said concerning the formation of slate, the student will readily understand that all the principal slate quarries in the United Kingdom are situate in the oldest rocks, viz., the Cambrian, Silurian, Devonian, and Carboniferous formations. It does not, however, of necessity follow that these highly altered argillaceous rocks are everywhere of such extreme antiquity. All that is required is great lateral pressure on a clay deposit, by which the particles composing the clay are rearranged. It so happens that the precise conditions producing such a material have not been present in rocks of later date than those indicated, as far as Great Britain is concerned. In other words, we have had no great mountain-making phenomena actively at work since those early times in this country. But we have only to study the Alps,—or, in fact, almost any of the more recently elevated mountain chains,—to be cognisant of the fact that slates may be of tertiary age, even approximately as recent as the deposits upon which London, Paris, or Brussels, stands.

English slate quarries are situated in Cornwall, Devon, Somerset, Leicestershire, Lancashire, Cumberland, and Westmoreland. Those at *Delabole*, near Tintagel, in Cornwall, have been justly celebrated for a long time for producing slate of great durability, in addition to lightness and strength. Borlase in 1758 speaks of the extent of these workings. The Delabole quarries produce not only roofing slates, but flagstones or brick slates, which are used for pavements in passages, court-yards, &c., and for tombstones. The inscriptions upon old tombstones of this slate remain remarkably perfect; showing its durability when exposed to atmospheric influences. These slates are shipped at Tintagel and Boscastle.* The colour is greyish-blue, and examples of it may be seen in Wellington College at Sandhurst. Other quarries in Cornwall are *Boscastle*, *Camel*, *Launceston*, and *Trewarnet*, near Padstow.

The slate from the *Burnstall* quarry, near Tavistock, which produced good roofing slate, is now nearly worked out. Other quarries, in Devonshire, are the *Pomphlet*, near Plymouth, which supplies chimneypieces, slabs for paving, and blocks for building; *Penricca*, near Totnes, where the slate is green, as may be seen in the Royal Exchange; and *Woodland*, near Newton Abbott.

Slate is obtained from Leicestershire, principally from the following workings:—*Swithland Quarry* is not less than 150 ft. deep; the beds dip nearly due east at from 30° to 40°. The cleavage runs N.N.E. by S.S.W., and is nearly perpendicular. As the pit has been deepened, the quality of the slate has been found to improve, the cleavage is more perfect, and much lighter roofing slates can be obtained. The Midland Railway Hotel at St. Pancras is roofed on one side with Swithland slate, and it has also been used in St. Mark's Church, Leicester, &c.† In *Groby Quarries*, the grain of the slate is not quite so fine as in the Swithland, but it nevertheless yields excellent slabs, which are sawn up by steam power. It is generally of purplish or grey tint, and has been found to improve as the workings get deeper. The Gas Offices at Sheffield, chancel of St. Paul's Church, Leicester, and one side of the St. Pancras Hotel are roofed with the grey slate. There is also a quarry at *Moorley Hill*, where the slate is coarse, gritty, and of a grey colour.

The principal quarries in Lancashire are the *Burlington*, near Ulverstone, producing pale blue slates and slabs; and *Coniston*, green rough slate and flags. There are also numerous small workings in the vicinity.

The slates of the Lake District are mostly of a pale blue or green colour, and those from near Kendal are of good quality; whilst beautiful green slates are quarried in Skiddaw and shipped at Maryport.

Comparatively speaking, the slate quarries of England, as a whole, are insignificant in many respects to those of *Wales*. The importance of this industry is manifest to every visitor to North Wales who cares to traverse the country around Bangor and Carnarvon. On ascending Snowdon from Llanberis, for instance, some large quarries may be seen on the opposide side of the lake, and the warning to the workmen to stand clear as a shot is about to be fired may be frequently heard. Often when the day is fine and the shot is an open-air one a puff of smoke may be seen, followed by a loud report, and then a noise resembling a great smash of crockeryware, as huge pieces of slate are observed falling down the side of the workings.

The *Penrhyn Quarries*, to the south of Bangor, afford employment to a large number of men. The general colours of the slates and slabs are blue or purple, but they are sometimes green. One is immediately struck on going into a quarry of this class with the tremendous heaps of waste material on every side. This is principally caused by much of the slate being imperfectly cleaved, owing to the difference in grain of the orginal argillaceous deposit. Of course, it can hardly be expected that such a great mass of clay as the hill in which these quarries are situated, is perfectly homogeneous in structure, that is, that no seams of sand or coarser material are present. It is these arenaceous beds or sheets of impure clay that, as a rule, have not taken on the true slaty cleavage.

The great hole forming the principal quarry is the largest artificial excavation we have ever seen, and the amount of slate removed is prodigious. The slate is raised by means of a lift to the desired position, where it is split and shaped. There are two platforms in this lift, in separate guides or frames, the one moving down as the other comes up. The motive power is water, which is let into a tank at the bottom of that platform which happens to be at the upper level. Thus weighted, it can be let down at any time, and by so doing the other platform is drawn up. When the weighted platform arrives at the bottom it is fixed, and the water is run off. Locomotives run along on the top of the mounds of rubbish, thus facilitating the removal of the material from place to place.

The are many other large slate quarries, known as the *Bangor*, *Dinorwic*, *Cilgwyn*, *Dorothea*, *Llanfair*, *Rhiwfachno*, &c., in Carnarvonshire. There are also numerous workings in Merionethshire, amongst which we may mention the *Cwmorthen*, *Diphwys Casson*, *Ffestiniog*, *Maenoffern*, and *Oakeley* quarries, which produce blue and grey roofing slates and slabs. Other quarries are situated in Montgomeryshire, Denbighshire, and Caermarthenshire.

Scotland is not without slates. They are principally quarried in Perthshire, Argyleshire, and Invernessshire. At *Ballachulish*, in the last-mentioned county, Gwilt says* that from five to seven millions of slates are annually extracted, the weight of which may be estimated at 10,000 tons. The refuse, amounting to upwards of five or six times this quantity, is thrown into the sea,—a ready method of getting rid of it at a small expense. The slate is of a dark blue colour, containing pyrites, which, however, do not weather out, but stand up like small cubes of brass.

Many Scotch slates occur with these pyrites, but as we have previously observed,† they do not under certain conditions detract from their value in the slightest degree. Amongst the slate quarries in Perthshire, we may mention the *Benledi*, *Birnam*, *Glenalmond*, *Glenshee*, and *Turin*; in Argyleshire, the *Easdale*; in Banff, the *Taniemouth*, near Ruthven; and in Aberdeenshire, the *Foudland* quarry, near Aboyne.

Irish slates are worked at *Killaloe*, near Tipperary, in Lower Silurian rocks. Prof. Hull says that these quarries lay open a vertical section of over 350 ft., and produce slates from 10 ft. square downwards, of a dull bluish-grey colour, and of good quality, though somewhat rough. The *Valencia* quarries are well known, from the fact that large slabs and flags are exported for making cisterns, baths, &c., to England. As a general rule, the cleavage is not very fine, but large slabs are raised of light bluish-grey or greenish tints. The Valencia slates are in the Devonian formation. At *Clonakilty*, near Cork, the material is quarried in lower carboniferous beds of very good quality, being both light and durable. The same may be said with regard to those from the *Old Head of Kinsale*, whilst the

* Guide to Museum of Practical Geology (1877), p. 36.
† Geology of Leicestershire and Rutland, by Harrison (1877), p. 9.

* Encyclopædia of Architecture, p. 522.
† *Builder*, vol. l., p. 728.

Ashford quarries in Wicklow produce slate like that of North Wales, near Bangor. Slates are also obtained from *Knockroe* and *Mealoughmore*, near Carrick-on-Suir, in Kilkenny.

VARIORUM.

The sixth edition of the "The Watch and Clock-makers' Handbook, Dictionary, and Guide," by F. J. Britten (London: W. Kent & Co.), has recently appeared. It is an exceedingly useful and well-arranged compendium of the subjects of which it treats, and the French and German equivalents of the technical terms and processes dealt with are given. Short biographies of eminent horologists, and descriptions of lathes and other tools, go to make up what is a very useful reference-book. It is very fully illustrated. A list of date-marks on gold and silver plate and watch-cases marked at Goldsmiths' Hall, London, going back to the year 1697 and forward to 1896, is not the least useful part of this excellent handbook.——From *Church Bells* Office (12, Southampton-street, Strand), we lately received "*Church Bells*' Album of Notable Ancient Yorkshire Churches," which, for sixpence, gives views of twenty-eight fine churches and minsters, accompanied by brief letter-press descriptions to each plate. While not vouching for the correctness of the historical and architectural notes (the author's name does not appear on the title-page) we nevertheless welcome this effort to popularise a knowledge of the main facts regarding so many of the principal churches in the large county of York.——Amongst recent trade-books received is the Coalbrookdale Company's Priced Catalogue of Iron Casements and Window Frames, which merits perusal on account of the practical information it gives. The London office and show-rooms of the Company are now at the corner of New Bridge-street and the Victoria Embankment.——Another useful trade book is Messrs. Charles Winn & Co.'s (Birmingham) illustrated catalogue of closet-flushing cisterns and general waterworks fittings, which is very complete and conveniently arranged, so that it will be handy for reference.——Belonging to somewhat the same category is "The Annual Export Catalogue of Machinery and Hardwares by the Principal Makers of Great Britain" (published at 147, Queen Victoria-street), which is now in the third year of its existence. It is likely to be very useful, and to facilitate business in all kinds and classes of machinery.——Messrs. Cassell & Company send us a parcel of their excellent magazines for January. The *Quiver* is a good number. One article in it, "Charles Wesley in Marylebone," by the Rev. John Telford, B.A., recalls to mind that Marylebone was quite a rural suburb at the date in question, *circa* 1740. *Cassell's Family Magazine* is varied and interesting in its contents. One of its articles is entitled "A Rural Paradise for London," the *locus in quo* being Parliament Hill and Fields, Hampstead. The author, F. M. Holmes, rightly urges that if this property be acquired as a metropolitan open space, the Metropolitan Board had better not attempt to convert it into a prim park. *Little Folks*, the ever-popular magazine for juveniles, commences a new volume with well-sustained variety and vigour.——From the Religious Tract Society we have received another parcel of magazines. Two of them, the *Child's Companion*, and a new venture, *Our Little Dots*, are admirable of their kind. For boys and girls who have passed the period of infancy, there are the *Girl's Own Paper* and the *Boy's Own Paper*, both of them established favourites. From the same publishers come the *Leisure Hour* and the *Sunday at Home*. The contents of the former include an interesting article by Professor Leone Levi, entitled "Fifty Years of Economic Progress."——Messrs. Crosby Lockwood & Co. will shortly issue a new edition of "Every Man's Own Lawyer," by a Barrister.

New Club Buildings at Kilburn.—New premises for the Kilburn and West Hampstead Constitutional Club are about to be erected at Kilburn, and the foundation stone of the buildings was laid last week. The structure will be faced with red brick, relieved with moulded brick and red Mansfield stone dressings. The building will consist of three floors,—basement, ground, and first floor. Mr. W. J. Middleton, of West Hampstead, is the architect, and Messrs. John Allen & Son, of the Palmerston Works, Kilburn, are the contractors.

ALMANACKS AND DIARIES FOR 1887.

"Whitaker's Almanack" for 1887 (published at 12, Warwick-lane, London) has this year been considerably improved and enlarged, so that it is not likely to lose the hold on the public favour which it has hitherto so deservedly maintained.

"Calvert's Mechanics' Almanack and Workshop Companion" for 1887 (London and Manchester: John Heywood) has now reached its fourteenth year of publication. It is very varied in its contents, and contains a mass of memoranda and formulæ likely to be of use in the workshop.

"Cassell's Illustrated Almanack" (London: Cassell & Co., Limited) is an attractive and useful one, and it is well illustrated.

Messrs. Hudson & Kearns, of Southwark-street, send us a parcel of their admirable Diaries, specially designed for the use of architects, builders, surveyors, and engineers. We find it difficult to add to our former commendations of these excellent publications; this only we need say, that the standard of excellence and completeness is fully maintained this year,—excellence as to get-up, quality of paper, &c., and completeness as to the mass of valuable tabular and other information which is bound up with each diary. We can strongly recommend "The Architect's Diary," Nos. 12 and 13, and "The Builder's Diary," No. 11. With the diaries we had submitted to us some excellent date-indicating writing-pads, very useful for office-desk or library table.

Messrs. T. J. Smith, Son, & Downes, of Queen Victoria-street, have sent us an assortment of T. J. & J. Smith's well-known scribbling, tablet, and pocket diaries. Messrs. Smith's diaries have now been before the public for more than forty years, so that they need no recommendation. Suffice it to say that they show no falling off in get-up, quality, or arrangement.

We have also received a small selection of Letts's Diaries, which, in the hands of their new publishers (Messrs. Cassell & Co., of La Belle Sauvage-yard), appear to fully maintain their character for excellence.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,730, Blocks for Fireproof Ceilings. J. D. Denny.

These blocks are for the construction of fireproof and ventilating ceilings, and lock one in the other, being self-supporting and not requiring any girders or pillars to be used. The bottom of the blocks form the ceiling, and the top of the blocks the floors, and openings or flues are left as may be required. A pattern is generally indented at the top of the blocks to prevent slipperiness. They are fixed with plaster of Paris and cement mixed.

502, Open Fire-grates. J. Jex Long.

According to this invention the upper part of the front plate above the front bars and the fire-plate or box is dome-shaped, or, as the inventor describes it, of a "hollow spheroidal arch shape." Within this enclosed space is fitted a sheet of metal, and the whole is hung so that it may be tilted forward or backward. A blower is also used of a special design. The object is to provide better ventilation and greater economy in fuel by management of the combustion of fuel.

616, Kilns, &c. J. Howie.

The floors of kilns constructed in accordance with this invention are formed from hollow bricks or blocks glazed inside, and so fitted together as to form a series of parallel flues for conveying steam or hot gases which serve to heat the chambers. They are by preference rectangular in cross section, and are formed so as to fit into each other, so that they may be jointed together with cement or luting. The shelves or stands on which the clay ware or other goods are placed are formed of the slabs in the same way as the floor and sides of the kiln.

770, Flooring Tiles, &c. W. Benson and Lehi Gunning.

This invention consists in preventing the adhesion of the clay surfaces while in a plastic condition by treatment with oil or water or suitable liquid. A hollow roller is used to spread or deliver the liquid as soon as the substance issues from the compressing chamber.

829, Flushing Pans, &c. J. G. Stidder.

According to this invention, at the back of the W.C. pan, or in any other position for suitably flushing the same, a flushing-fan with three or more lips is placed. These lips project into the pan at different angles, the central lip projecting at a greater angle than the other lips, which are more vertical so as to force away all matter from the sides of the pan and out into the traps at the first flush of water.

12,597, Lock-up Ventilators. J. Treasure.

The ventilator which is the subject of this invention is formed with a sliding plate, which being moved backward or forward opens or closes the apertures for the admission of air. The plate is actuated by a square-headed spindle, which is turned with a key fitting the square head. When the key is removed the ventilator cannot be altered.

NEW APPLICATIONS FOR PATENTS.

Dec. 10.—16,171, S. Hazeland, Planing Wood.—16,185, M. Bibbero, Gasfittings.—16,213, W. Murray, Window Sashes and Frames.

Dec. 11.—16,225, A. Edmondson and Others, Hinges.—16,272, A. Ramsden, Pipe Joints.

Dec. 13.—16,294, H. Bassett, Window-sash Fastener.—16,312, W. Illingworth, Joiners' Adjustable Bench Stop.—16,336, R. Schouler, Drain-pipes, &c.

Dec. 14.—16,357, R. Warwick, Parquetry.—16,360, C. Ewing, Sash Fastener.—16,390, L. Oppenheimer, Wood Block Flooring.

Dec. 15.—16,429, F. Hayward, Varnish.—16,451, C. Challis, Mechanism and Attachments for Bells.—16,452, F. Crittall, Stoves or Fireplaces for Warming and Ventilating.—16,471, G. Redfern, Hearths or Fireplaces.—16,480, W. Joy, Portland Cement.

Dec. 16.—16,496, J. Myatt, Drain Chains or Rods.—16,498, E. Court, Jack and Spoke Shaves.—16,514, C. Wedenby and J. Dodd, Chisels, Screwdrivers, &c.—16,520, T. Lowcock, Door-springs.—16,527, J. Havard, Window-sash Fastener.

PROVISIONAL SPECIFICATIONS ACCEPTED.

11,782, A. Barratt, Screw-drivers.—13,632, H. Walker, Wood-boring Tool.—13,959, J. Howie and T. Groves, Open Kilns.—14,206, R. Lee, Fastenings for Windows.—14,545, J. Bridger, Glass Tile, Panel, or Light.—14,916, A. Edmondson and Others, Bolts or Bars for Doors, &c.—14,954, J. and G. Turner, Combination Latches and Handles for Doors, &c.—15,113, J. Tucker, Lock.—14,674, N. Scott and Others, Portland Cement, &c.—15,779, W. Wieghorst, Bakers' Ovens.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

13,945, J. Hill, Opening and Closing Fanlights and Casements.—2,070, J. Watson, Cowls or Caps for Ventilating Shafts, Flues, &c.—2,310, D. Swan, Pigments.—4,224, A. Ryles, Ornamenting Panels, Tiles, &c.—6,934, S. Rogers, Saw-sharpening Machines.—2,199, W. Tylor, and W. Drayson, Closet-basin and other Joints.—2,337, R. Lacey, Latches.—2,399, H. Faija, Apparatus for Mixing Concrete.—14,880, H. Lake, Metallic Lathing and Fixing same.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

December 13.

By Wood & Spink.

Windsor—The Victoria Livery Stable, freehold	£1,985

By Murrell & Scorell.

Limehouse—Nos. 37, 39, and 41, Aston-street, copyhold	455
Nos. 27 and 29, Cayley-street, copyhold	345

By Graves & Son.

Tooting—1 to 13, Atholl-terrace, and 1 to 6, Melrose-terrace, 92 years, ground-rent 86*l.* 10*s.*	5,550
Paddington—7 and 9, Marlborough-street, 63 years, ground-rent 11*l.* 5*s.*	705

December 14.

By Reynolds & Eason.

Houndsditch—36 to 30, Hutchinson-avenue, freehold	1,120

By Robinson & Rudkin.

Hendon—30 and 32, Ash-grove, 93 years, ground-rent 11*l.* 12*s.*	450

By W. J. Mullis.

Notting-hill—Nos. 250, 252, 254, and 256, Lancaster-road, 75 years, ground rent 29*l.*	1,670

By Fuller & Fuller.

Mile End—Nos. 3, 5, and 7, Clinton-road, freehold	630
Deptford—Freehold ground-rent of 8*l.* per annum, reversion in 19 years	210
Blackfriars—No. 56, Stamford-street, freehold	1,500

By Frank Jolly & Co.

St. Luke's, Errol-street—Business premises, 79 years, ground-rent 3*l.*	400

December 15.

By Hobson, Richards, & Co.

Old Kent-road—Nos. 806 to 814, and 824 to 838 (even), Hope Cottage; two plots of freehold land; and ground-rents of 26*l.*, reversion in 37 years	5,800
Camberwell—Nos. 47 and 49, Paulet-road, 81 years, ground-rent 13*l.*	795

By Lound & Howitt.

St. Pancras—An improved ground-rent of 11*l.*, term 49 years	165
Hampstead-road—An improved ground-rent of 12*l.* 12*s.*, term 40 years	195
An improved ground-rent of 16*l.*, term 51 years	265
Bayswater—No. 2, Courtnell-street, 60 years, ground-rent 8*l.*	630
Edgware-road—An improved rent of 90*l.*, term 35 years	1,220

By H. Rutley.

Kensal-green—No. 2, Church-place, freehold	670

By R. J. Collier.

Upper Clapton—No. 253, Evering-road, 98 years, ground-rent 8*l.*	700

By J. W. COADE.

Brunswick-square—No. 20, Hunter-street, 23 years, ground-rent 26*l.* 5*s.*	£330

DECEMBER 16.

By GLASIER & SONS.

Prince's Gate—Ground-rents of 50*l.* a year, term 68 years	1,000

By HARDS & JENKINSON.

Muswell-hill—A plot of freehold land	180

By BEAN, BURNETT, & Co.

Islington—No. 12, South-street, 22 years, ground-rent 2*l.*	150
Shortlands, Bromley-road—Four plots of freehold land	815

By NEWSON & HARDING.

Finsbury—Ground-rent of 9*l.*, reversion in 22 years	1,070
Holloway—Ground-rent of 6*l.* 6*s.*, reversion in 63 years	165
Chalk Farm—Ground rent of 44*l.* 9*s.*, term 44 years	715
Paddington—Nos. 15, 16, and 17, North Wharf-road, 34 years, ground-rent 15*l.*	405
150*l.* Stock in the Gas Light and Coke Company	410
Barnsbury—Nos. 13, 17, and 19, Denmark-street, 32 years, ground-rent 18*l.*	895
Stoke Newington—Nos. 23 and 24, Newington-green, freehold	1,310
Islington—Nos. 509 and 519, Liverpool-road, freehold	960
Blackfriars—Nos. 5 to 11 (odd), Burrell-street, 25 years, ground-rent 26*l.*	595
Borough—Nos. 20, 22, and 24, Brockham-street, and 49 and 51, Swan-street, 84 years, ground-rent 36*l.* 4*s.*	300
Brixton—No. 34, Loughborough Park, 36 years, ground-rent 6*l.*	535
High Holborn—No. 190, freehold	1,500

By E. ROBINS & HINE.

Hornsey—No. 129, Lothair-road, 91 years, ground-rent, 6*l.* 6*s.*	285
Oxford-street—The lease of No. 51, term 4 years	105

DECEMBER 17.

By NORTON, TRIST, WATNEY, & Co.

Hackney—Ground-rents of 13*l.* 10*s.*, term 75 years	280

By A. WALTON.

City—The lease of No. 89, Worship-street, term 10 years	210
Edmonton—Ground-rents of 37*l.* 10*s.*, reversion in 75 years	730

By GIDDY & TURNER.

Hendon—Ground-rent of 100*l.*, reversion in 78 years	2,070

Miscellanea.

Underpinning at Bolton. — We are informed that Messrs. J. Kershaw & Co. have recently undertaken a somewhat novel piece of work at their Derby-street Mills, — a work which is almost American in its boldness. They have for some time been in want of extra accommodation in connexion with this mill, and as the site is limited, the firm conceived the idea of underpinning the whole of the present building, and constructing beneath it an entirely new story. With this idea they consulted Messrs. Cunliffe & Pilling, architects, of Bolton, as to the advisability of undertaking such an extension, and the possibility of executing it without stopping he mill,—that being a *sine quâ non*. The rchitects, having advised favourably as to the scheme, undertook the work of preparing plans and designing the necessary shoring, &c., and the work was entrusted to Messrs. W. Dobie & Sons, contractors, of Nelson-street, Bolton, who successfully carried out the work, which has been executed under the direct supervision of Mr. W. S. Dobie, one of the firm. The present building is three stories high, and the machinery and shafting in each story has been running truly during the whole time of the alterations. The new basement is fireproof, constructed with small span brick arches, on wrought-iron girders, concreted on the top, and flagged. The old pillar foundations have been taken away, and new iron pillars substituted in their place. The main walls of the new story have been formed by cutting out the foundations and footings of the present building, and underpinning the old walls, which are supported in short lengths, whilst the new walls are built up solid from the lower level. The contractors have had to cut out and remove about 200 tons of stone from the old wall and pillar foundations, and have carted away between 2,000 and 3,000 cubic yards of solid earth.

Corrugated Iron Buildings. — Messrs. North & Son, of London-road, Southwark, call our attention to their system of erecting corrugated iron buildings with iron dowels and T and angle-irons, whereby they claim that every part comes together interchangeably for erecting or removal without damage, besides adding greatly to strength, economy, and facility of erection.

Competition: Slough Public Hall.—Mr. T. R. Richards, who has been employed as assessor in the competition for this building, recommended the design signed "Be Strong," subject to verification of estimates. The committee have adopted his recommendation. The author of the design is Mr. F. W. Albury, of Reading.

The Distribution of Electricity.—We have lately had an opportunity of examining the Callender and Webber system for the laying down of ways for underground cables, which secure the protection and provide for the maintenance of the cables. The first working example is now on exhibition at the Borough-road works of the Anglo-American Brush Electric Light Corporation, Limited. It is what is known as a "drawing-in" system; its speciality consisting in the provision of a separate "way" for every cable, each way being a closed passage impervious to water or gas, completely separate from all other ways and earth by a wall of material in itself a fair insulator. The danger of "earths" or "contacts" is thus reduced to a minimum, as it would be necessary to penetrate both the wall of the case and the dialectric of the cable before the insulation could be destroyed. The cases or "ways" are constructed of a bitumen concrete, possessing great strength, impervious to water, and unaffected by the gases or acids found in the soil. It does not expand or contract. The cases are preferably rectangular in form, pierced with holes or ways of a diameter suitable for the cables to be drawn in, a separate way being made for each cable, and the cases being made to carry the number required. They are generally 6 ft. in length, but can be supplied in from 3 ft. to 12 ft. pieces. Their ends are trued, so that each butts exactly on to its neighbour; the joints are formed by saddles closing round the cases cemented together by molten material, similar in composition to that of which the cases are made, the whole then forming one homogeneous mass. Light shields are fitted in the ways and kept in position by mandrils to ensure that no bitumen shall penetrate during the process of jointing, and that no rough edges present themselves at the joints which might interfere with the drawing of the cable or injure it in its passage. Drawing-in boxes or manholes, of the usual type, are provided wherever necessary, to give access to the cables for repairs, or for providing additional leads. The bitumen concrete in question is made under the patent of J. W. Butler, and the system of laying is that patented by T. O. Callender, 101, Leadenhall-street, and Major-General Webber, C.B., R.E.

House Fires without Smoke. — At a meeting of the National Smoke Abatement Institution, held on the 13th inst., Mr. Ernest Hart in the chair, Professor Frankland, F.R.S., gave an interesting description of the smokeless fires which had been burned in his house during the last five years, none of the chimneys having been swept during that time. The grates are the ordinary open ones that were in the house when he took it, no alteration having been made beyond a slight addition involving a cost of about 2*s.* The fires are lighted with wood, in the ordinary way, without difficulty, and the servants appreciate them for their cleanliness. Professor Frankland, at the request of the Council, promised to give a lecture on the subject shortly. It was reported that the Council had been in correspondence with the Home Secretary on the subject of the insufficiency of the fines inflicted in cases of smoke nuisance, and that subsequently, at a meeting of the metropolitan magistrates, presided over by Sir James Ingham, it had been resolved to increase the fines in all cases. A report on the work of the Institution was read, which described a considerable number of new smoke-prevention appliances which had been brought to the notice of the Council, especially some new smokeless stoves, which showed, by the reports of the testing engineer, Mr. D. K. Clark, M. Inst. C.E., greatly increased duty for the amount of fuel consumed. It was resolved that the Home Secretary be requested to receive a deputation to lay before him the inefficiency of the existing Smoke Abatement Acts in the metropolis, and the mal-administration of those Acts in the provinces, and also information upon the subject of modern heating methods and the means of preventing smoke from furnaces and domestic fires. It was also resolved that the First Commissioner of Works be requested to receive a deputation on the subject with reference particularly to the deterioration of public buildings by smoky atmosphere.

Lincrusta-Walton. — We have received some samples from the Lincrusta-Walton Company of new designs for wall-hangings in their material, which are very artistic in character, and which appear to be produced at very low prices considering the effect obtained.

Local Self-Government.—Mr. Silvanus Trevail, member of the Truro City Council, lectured before the Redruth Institution in the Druids' Hall, recently, on the subject of local self-government. The complications of our present system, he said, were such as no other civilised country would tolerate, and could only be excused on the ground that as each new want presented itself, our Parliament added another scrap of legislation to meet it, by the creation of a special Board for each special object,—a system at once the most primitive and extravagant. Mr. Trevail would, therefore, start by having one local body, and only one, to transact all the administrative business of a district. This Board he would call the primary body, and it should be similar in its functions and constitution to the Town Council of a municipal borough, excepting that all its members should be elective directly from the ratepayers. This body might be named the "local council," to distinguish it from present Boards, all of which it should supplant, absorbing their several functions to itself. In conclusion, Mr. Trevail summarised his main proposition as being the simplification and unification of the primary area, the creation of one authority for all local business, and only one; the creation of County Boards, the reorganisation of the staff of local government officials, and the consolidation of local finance. He thought if such a scheme were inaugurated in this country it would attract some of our most capable citizens to the duties of local government, a seat in which would be second only to that in the Imperial Parliament, while the relief afforded to the latter body would be its salvation; and that no better training could exist than in the county parliament for qualification for membership in the higher body.

Presentation Dinner.—On Saturday evening last, at the Holborn Restaurant, Mr. Alexander Ritchie, who for the past twenty-seven years has been associated with the Milton Ironworks, Glasgow, was entertained at dinner by the staff of the firm of Steven Bros. & Co., of Upper Thames-street (the London house of the Milton Foundry, of which firm Mr. Ritchie has for the past seventeen years been the manager), and a company of private friends. The principal cause of the gathering was to present Mr. Ritchie with an illuminated address from the staff, a gilt inkstand and candelabra from the warehousemen of the firm, and a silver *épergne* from his private friends, and to congratulate him on his return to business after six months' enforced absence caused through a serious carriage accident in April last, when he sustained a serious compound fracture which was followed by a painful illness. At the dinner referred to, congratulations were expressed by all present, and a very pleasant evening was spent, brightened as it was by a contribution of vocal and instrumental music from the members of the staff. The proceedings throughout were of a very hearty character.

Trade Smoking Concert. — On Saturday last the office staff of the well-known firm of William Brass & Son, builders, Old-street, gave their second annual smoking concert at the Masons' Hall Tavern, Basinghall-street, when about 120 clerks and friends (several gentlemen from other well-known firms being present) spent a very enjoyable evening. After the programme had been carried out, the Chairman proposed the toast of the evening, viz., Messrs. William Brass & Son, which was heartily responded to, after which the singing of "Auld Lang Syne" brought the evening to a close.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 10 0	7 0 0
Teak, E.I. ....load	9 0 0	14 0 0
Sequoia, U.S. ....foot cube	0 2 4	0 2 7
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...	2 5 0	3 10 0
Elm ,, ...	3 10 0	4 10 0
Fir, Dantsic, &c.	1 10 0	4 0 0
Oak ,, ...	2 10 0	4 10 0
Canada	3 0 0	6 0 0
Pine, Canada red	2 0 0	3 10 0
,, yellow	2 5 0	4 0 0
Lath, Dantsic ....fathom	3 0 0	5 0 0
St. Petersburg	4 0 0	5 10 0
Wainscot, Riga ....log	2 15 0	4 0 0
,, Odessa, crown....	3 5 0	3 7 6
Deals, Finland, 2nd and 1st...std.100	7 0 0	8 0 0
,, 4th and 3rd	6 0 0	6 10 0
Riga	5 10 0	7 0 0
St. Petersburg, 1st yellow	8 10 0	14 0 0
,, 2nd ,, ...	7 0 0	8 0 0
,, white	7 0 0	10 0 0
Swedish	6 0 0	15 0 0

TIMBER (*continued*).	£. s. d.	£. s. d.
Deals, White Sea	7 0 0	17 10 0
Canada, Pine, 1st	17 0 0	29 0 0
,, ,, 2nd	11 0 0	17 0 0
,, ,, 3rd, &c.	6 0 0	8 0 0
,, Spruce, 1st	8 0 0	11 0 0
,, ,, 3rd and 2nd	5 0 0	7 10 0
New Brunswick, &c.	5 0 0	7 0 0
Battens, all kinds	4 0 0	12 0 0
Flooring Boards, sq. 1 in., Prepared, first	0 9 0	0 13 0
Second	0 7 6	0 8 6
Other qualities	0 5 0	0 7 0
Cedar, Cuba ....foot	0 0 3	0 0 3½
Honduras, &c.	0 0 2½	0 0 3¼
Australian	0 0 2	0 0 3
Mahogany, Cuba	0 0 4	0 0 7
St. Domingo, cargo average	0 0 4	0 0 7
Mexican ,,	0 0 3½	0 0 4½
Tobasco ,,	0 0 4	0 0 6
Honduras ,,	0 0 4	0 0 6
Maple, Bird's-eye	0 0 6	0 0 8
Rose, Rio ....ton	7 0 0	10 0 0
Bahia	6 0 0	10 0 0
Box, Turkey	5 0 0	17 0 0
Satin, St. Domingo ....foot	0 0 6	0 0 10
Porto Rico	0 0 7	0 1 0
Walnut, Italian	0 0 4	0 0 5

METALS.		
Iron—Bar, Welsh, in London....ton	4 7 6	4 15 0
,, ,, in Wales	4 2 6	4 7 6
,, Staffordshire, London	5 10 0	6 0 0
Sheets, single, in London	6 15 0	8 10 0
Hoops ,,	6 0 0	7 0 0
Nail-rods ,,	5 15 0	6 10 0

METALS (*continued*).	£. s. d.	£. s. d.
Copper—		
British, cake and ingot ....ton	42 10 0	43 0 0
Best selected	43 0 0	43 10 0
Sheets, strong	51 0 0	52 0 0
Chili, bars	38 10 0	39 0 0
Yellow Metal ....lb.	0 0 4	0 0 4½
Lead—		
Pig, Spanish ....ton	12 13 9	0 0 0
English, common brands	12 17 6	0 0 0
Sheet, English	13 16 3	13 18 9
Spelter—		
Silesian, special ....ton	14 7 6	14 10 0
Ordinary brands	14 5 0	14 7 6
Tin—		
Straits ....ton	100 0 0	0 0 0
Australian	100 5 0	0 0 0
English ingots	104 10 0	0 0 0

OILS.		
Linseed ....ton	20 0 0	20 5 0
Cocoanut, Cochin	37 10 0	0 0 0
Ceylon	26 10 0	0 0 0
Palm, Lagos	23 10 0	24 0 0
Rapeseed, English pale	22 5 0	22 10 0
,, brown	20 17 6	21 0 0
Cottonseed, refined	18 10 0	19 10 0
Tallow and Oleine	25 0 0	43 0 0
Lubricating, U.S.	6 0 0	10 0 0
,, refined	8 0 0	13 0 0
Turpentine—		
American, in casks ....cwt.	1 6 6	1 6 9
Tar—		
Stockholm ....barrel	0 15 0	0 15 6
Archangel	0 11 0	0 11 6

COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Laying-out Pleasure Grounds, &c.	Guildford Town Council	30*l.*, 20*l.*, and 10*l.*	Feb. 14th	ii.
Asylum Buildings	Borough of Maidstone	Not stated	March 1st	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Cast and Wrought Iron for Bridge	Sheffield Corporation	Robt. Davidson	Dec. 31st	ii.
Provision Market and Arcade	Eastbourne Market Co.	G. Fuller	Jan. 5th	xvii.
Additions and Alteration to Laundry	Kensington Guardians	H. H. Bridgman	Jan. 6th	xvii.
Stores and Materials	Liverpool Corporation	*Official*	Jan. 7th	ii.
Alterations to Local Board Offices	Tottenham Local Board	— De Pape	Jan. 11th	ii.
Making-up Roads, &c.	do.	do.	do.	ii.
Brick Sewer	do.	do.	do.	ii.
Kerbing, Tar-Paving, Metalling, &c.	Lewisham Brd. of Wks.	*Official*	do.	ii.
Sewerage Works	Com. of Sewers, Lincoln	J. Kingston	Jan. 31st	xvii.

TENDERS.

BARNES.—For additions to the Westfield Schools, Barnes, for the Barnes School Board. Mr. Henry Jacques, architect:—

W. H. Fazan	£994 0 0
W. Hallett	980 0 0
Geo. Barnes	970 0 0
Charles Wall, Chelsea	933 0 0
F. R. Tozer	919 0 0
W. J. Beale	895 0 0
R. L. Wood	885 0 0
G. Stephenson	871 0 0
G. Lyford	860 0 0
F. H. Dawes	853 0 0
Webb & Rosser	813 0 0
Jas. Tozer	797 0 0
J. Hill	784 4 0
H. Haynes	775 0 0
A. Sale, Barnes	769 0 0
Newton & Idle	768 0 0
J. Channon	750 0 0
J. M. Goodwin	738 13 6
A. Hunt, Barnes	720 0 0
H. Pickersgill, Fulham	705 0 0
A. & E. Braid	699 0 0

CANNING TOWN.—For rebuilding two shops at Rathbone-street, Canning-town, E. Mr. J. H. Bethell, architect:—

T. Baxter	£698 0 0
W. Parsons	645 0 0
Allerton & Fox	545 0 0
J. W. Wyles (accepted)	548 10 0

CROYDON.—For asphalting works to playgrounds at the Princes-road, Oval-road, and Brighton-road Schools, for the Croydon School Board, under the direction of Mr. Robert Ridge, surveyor to the Board:—

H. Lake, Croydon (accepted)	£582 3 4

EALING.—For the erection of a new wing to the Public Baths, Ealing, for the Ealing Local Board, under the superintendence of Mr. Charles Jones, C.E., surveyor to the Board:—

Jones Bros.	£1,728 0 0
W. A. Road	1,680 0 0
Oldrey & Co.	1,655 0 0
W. J. Beale	1,648 0 0
Priestley & Gurney	1,645 0 0
Wardrup	1,644 0 0
W. H. Waters	1,573 0 0
H. Haynes	1,550 0 0
H. Pickersgill, Fulham	1,530 0 0
Adamson & Sons (accepted)	1,495 0 0

GOOLE.—Accepted tenders for enlarging the Alexandra-street Schools, Goole, for the School Board of Goole. Mr. William Watson, architect, Wakefield:—

Excavating, Brick, and Stone Work, Plastering, Carpenter and Joiner's Work.	
Newbould & Garner	£1,368 13 8
Slating.	
George Stewart	139 0 0
Plumbing, Glazing, Gas, and Iron Work.	
Webster, Jackson, & Co.	276 0 0
Painting and Staining.	
M. Baron	45 0 0
Total	£1,828 13 8

[All of Goole. Seventy-eight tenders received.]

LONDON.—For new studio, alterations, and additions, No. 13, Portland-place, W., for Mr. William Quiller Orchardson, R.A. Mr. Charles F. Moxon, architect. Quantities by Mr. Henry Bushell, Finsbury-pavement:—

Church & Co., Coleman-street	£1,538 0 0
T. H. Kingerlee, Oxford	1,403 0 0
J. K. Tibbetts, Buckingham	1,370 0 0
S. C. Parmenter, Braintree	1,330 0 0
Clarke & Bracey, Coleman-street	1,293 0 0
G. H. & A. Bywaters, Regent-street	1,283 0 0
Lawrance & Sons, City-road	1,170 0 0
L. C. Roper, New Cross*	1,163 0 0

* Accepted.

LONDON.—For rebuilding No. 18, Cowcross-street, E.C., for Mr. H. Wilson. Mr. J. H. Bethell, architect:—

S. Goodall	£917 0 0
John Garrud	831 0 0
George Moore	803 15 6
E. Battershill	761 12 0
J. W. Wyles	635 19 0
J. Studds & Son (accepted)	636 1 0

RIPLEY (Surrey).—For additions to premises, Ripley, for Mr. Lucas. Mr. Richard Peters, architect, Wool Exchange, E.C.:—

Lee	£410 0 0
Christmas	293 0 0
Whitburn (accepted)	250 0 0

SHERBORNE.—For Ham stone work for new Sanatorium, King's School, Sherborne:—

Ham & Son	£485 0 0
S. & J. Staple	465 0 0
Jno. Trask & Co. (accepted)	429 0 0

WAKEFIELD.—Accepted tenders for alterations, Westgate Schools, Wakefield, for the Wakefield School Board. Mr. William Watson, architect:—

Excavating, Brick, and Stone Work.	
George Fawcett	£182 9 8
Slating.	
C. F. Bycroft	8 0 0
Plastering.	
Charles Abson	3 4 6
Carpenter and Joiner's Work.	
Edwin L. Craven	25 7 6
Plumbing, Glazing, Gas, and Iron Work.	
Samuel Atkinson	42 10 0
Painting.	
C. Turner & Sons	3 15 0
Total	£264 6 8

[All of Wakefield. Thirty-four tenders received.]

WAKEFIELD.—Accepted tenders for converting premises into shops, Kirkgate, Wakefield. Mr. William Watson, architect:—

Excavating, Brick, and Stone Work.	
George Fawcett	£146 10 0
Slating.	
Pickles Bros.*	35 16 0
Plastering.	
Charles Driver	8 14 0
Carpenter and Joiner's Work.	
Charles Squires	156 10 0
Plumbing, Glazing, Gas, and Ironwork.	
Samuel Atkinson	96 10 0
Painting.	
C. Turner & Sons	16 10 0
Total	£460 19 0

* Of Leeds, the rest of Wakefield.

[Thirty-five tenders received.]

TWELVE GOLD AND SILVER MEDALS AWARDED.

IRON CISTERNS.

F. BRABY & CO.

VERY PROMPT SUPPLY.

LARGE STOCK READY.

Particulars on application.

CYLINDERS FOR HOT-WATER CIRCULATION.

LONDON: 352 to 364, Euston-road.

LIVERPOOL: 6 and 8, Hatton Garden.

GLASGOW: 335, Argyle-street.